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THE NORMAL AND MORBID PHYSIOLOGY OF THE THYROID GLAND*

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THE term "endocrinology" is now in common use to denote the study of the internal secretions. The expression "endocrine organs" is not usually extended to such organs as the lymph glands, tonsils, the spleen and bone marrow. The endocrine organs are ductless glands which *secrete specific chemical substances* into the blood for the purpose of influencing other organs. Specific chemical agents are produced by organs other than the ductless glands, *e.g.*, the pancreas, the internal secretion of which is even of greater importance to the organism than its external secretion. Other examples of a combination of external and internal secreting mechanisms are the duodenal mucous membrane, and the generative glands.

The nature of the active principles in internal secretions.—External secretions contain enzymes as their active agents. These enzymes, which are readily destroyed by heat, occur in the bioplasm of all cells; in fact, the chemical activity of the cell depends upon its enzymes. On the other hand, the endocrine organs possess active chemical agents which are not destroyed by heat, are not rendered inactive by boiling, and are dialysable. Some have been obtained in the pure state; two only have been prepared synthetically. The action of these specific chemical substances is varied; some act immediately, *e.g.*, secretin; others act very slowly, affecting growth and nutrition, *e.g.*, thyroxine. Again some stimulate cell function, while others inhibit it. The general name "hormone" was given by Starling to the active principles contained in the internal secretions; the word means "to excite", and therefore cannot strictly be applied to all the agents produced, for the simple reason that some inhibit or depress function. Because of this, Sir Edward Sharpey-Schafer suggested the general term "autacoid" (Gk: αὐτός; self, and ἄκος: a medicinal remedy) for all specific organic substances formed by cells; these may be excitatory or inhibitory in action. Excitatory autacoids are strictly "hormones"; inhibitory autacoids are called "chalones". It is important to remember that an autacoid may produce opposite results in different parts of the body; for example, adrenaline contracts the plain muscle of the systemic artery, it relaxes that of the coronary artery. In both cases it is a hormonic action, because a specific reaction has been aroused; on the one hand, contraction, on the other, active relaxation. A further possibility must also be borne in mind; namely, that an autacoid under certain conditions may act as a *hormone* or excitant, and under entirely different conditions it may act as a *chalone* or a depressant. The best example of such activity is adrenaline, which while it is hormonic in its action on the circulatory system is chalonic in its action on the muscular coat of the intestine.

The origin and structure of the thyroid.—The thyroid is the first organ to appear in the human embryo, being seen about the third week, when the embryo is 1.4 mm. long, as a hollow median thickening of the entoderm lining the floor of the pharynx at a level between the first and second branchial pouches. The fully developed gland consists of small closed vesicles of an irregular spheroidal shape, about 0.05 to

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0.1 mm. in diameter, lined by columnar or cubical epithelial cells, and containing colloid. The gland is one of the most vascular organs in the body; its nerve supply is from the sympathetic directly, by way of the superior and inferior laryngeal nerves. The lymphatics of the gland form two distinct systems; a thyro-thymic lymph system which connects the thyroid with the thymus and is derived from the thyro-gill-lymph system seen in fish (Burne,[5]) and the capsular lymphatics which drain into the general lymphatics of the neck.

The active principle: thyroxine. — In 1924 Abderhalden found that a di-iodo-tyrosin, in the concentration of 1.5 mgrm. per 100 c.c. of water, promoted growth and metamorphosis in tadpoles. In 1912 Gudernatsch[7] showed that thyroid extracts had a similar action. In 1914 Kendall[12] isolated thyroxine in pure form and showed that it contained 65 per cent of iodine. In 1926 Harrington[9] discovered the true formula and in 1927 Harrington and Barger[10] produced thyroxine synthetically. The chemical analogy between thyroxine, tyrosine and epinephrine is worth noting.

THE ACTION OF THYROXINE

As a catalyst.—The activity of thyroxine as a living catalyst depends upon its iodine content. One milligram of thyroxine is capable of increasing heat production by 1000 calories. This is the amount of heat produced by the oxidation of about 250 grm. of glucose, and is an indication of what has been called the "calorigenic power" of thyroxine.

Tissue action.—The question which is still unsettled is whether or not this action is direct or indirect. Evidence for the former is the experimental work of Aub and others,[2] who state that the basal metabolic rate of a cat under urethane anæsthesia is definitely raised by thyroxine. This result is also got when the adrenals have been removed. It is well known that adrenaline increases the rate of the isolated, denervated heart; it is not so well known that thyroxine added to the blood circulating through a denervated heart-lung preparation causes a definite acceleration of its rate. Such experiments would tend to show that thyroxine directly stimulates oxidation in the tissue cells. Opposed to this idea is the work of Abderhalden and Wertheimer,[1] who show that rats, whose sympathetic nervous system has been paralyzed by ergotamine, show *no* increase in their basal metabolic rate upon the administration of thyroxine.

The action on blood sugar.—Thyroid extract given to dogs causes an increase in blood sugar and a decrease in the glycogen content of the liver. In hyperthyroidism the liver loses its power of retaining glycogen or the glycogen is oxidized more quickly. In cases of hypothyroidism the opposite obtains. It appears from the work of Richardson, Levine and du Bois that in man, hyperthyroidism, *i.e.*, in exophthalmic goitre, there is no deficiency in glycogen storage in the liver.

Action on protein metabolism. — Protein metabolism is increased. This was first pointed out by Voit[24] in 1897 in experiments in which he administered thyroid extract to dogs. The injection of thyroxine into a normal dog raises the fasting urinary nitrogen from 3.5 to 5.5 grm. An intravenous injection of 7 mgrm. of thyroxine into a fasting man with a total urinary nitrogen reduced to 2.10 grm. per day caused a rise to 6.12 grm. on the seventh day after injection. (Sandiford, *et al.*[18]). Daily injections of 0.2 mgrm. of thyroxine will prevent the urinary nitrogen from returning to its original low basal figure. To maintain the basal metabolic rate of a myxœdematous subject at or about the normal level requires between 0.2 and 0.4 mgrm. of thyroxine. The total amount of thyroxine in the adult body is put at between 12 and 14 mgrm. A completely thyroidectomised individual would require an initial injection of 12 mgrm. and a daily injection of less than 1 mgrm. to keep him at the normal level of basal metabolism.

Different effects of thyroxine on normal animals.—On *normal* animals, the administration of small doses of thyroxine produces (1) diminution in the rate of growth; (2) a disappearance of fat; (3) hypertrophy of these organs which are associated with metabolism, *e.g.*, heart, kidney, liver, adrenals; large doses to similar animals produce (1) loss of body weight; (2) gastro-intestinal troubles, and (3) tachycardia, but *no exophthalmos.*

Now in hyperthyroidism, where there is an excessive secretion of thyroxine from the gland, the effects are (1) increased basal metabolic rate; (2) increased oxygen consumption; (3) increased CO_2 output; (4) increased nitrogen excretion; (5) increased cardiac output (minute

volume from 5 to 12 litres); (6) increase in blood sugar; and (7) sensitization of the sympathetic nervous system. The administration of iodine produces a decided, if only temporary, amelioration of these effects. The question arises is it the presence of iodine in the thyroxine molecule which is responsible for these changes?

IODINE AND ITS ACTION IN SIMPLE GOITRE AND IN EXOPHTHALMIC GOITRE

The question of the relation between iodine and goitre is a very old one. As far back as 1820 Coindet reported that goitre could be reduced in size by iodine. The high incidence of goitre in localities where the amount of iodine available in water and foodstuffs was low was first pointed out by Chatin in 1852. The presence of iodine in the thyroid gland was first demonstrated by Baumann[3] in 1896.

It is of interest and of importance to know that goitrous areas are not unusually sharply limited to regions which are either mountainous or glacial. The best examples are the Alps, the lake districts of England, Norway and Sweden, the mountainous northwest corner of the United States and the Himalayas. Much statistical study has been devoted to the relation between natural iodine supply and the incidence of endemic goitre by Fallenberg (1925) in Switzerland, Marine,[13] McClendon and Williams[15] in the United States, and McCarrison[14] in India. But while the great mass of evidence does support the idea that endemic goitre is an iodine deficiency disease, one must remember that many observations brought forward in proof of this have not found universal acceptance. Commissions set up by the Paris Academy did not accept the findings of such a chemical authority as Chatin. Col. McCarrison maintains that in India the determining factor in the development of endemic goitre is a toxic agent derived from the alimentary tract, rather than a deficiency of iodine in water or in food.

An interesting and recent statistical investigation, carried out by Shore and Andrew[20] in New Zealand, where 24,000 school children were examined and 300 soils in certain well defined districts in the North Island of New Zealand chemically analyzed, has shown that the incidence of endemic goitre is inversely related to the iodine content of the soil and not to that of the water. A further piece of evidence to offset this comes from independent work on animals by McCarrison, Tanable and, recently, Hellwig, which would show that the positive factor in the causation of goitre is the high calcium content of the drinking water. The calcium is stated to interfere with the absorption of iodine even if the latter be present in sufficient amounts.

The deficiency in iodine may be brought about in three ways:—

1. Increased demand for thyroxine by the body at certain times, *e.g.*, at puberty, during pregnancy, at the menopause and during acute infections.

2. By factors which interfere with absorption or utilization of the normal intake of iodine.

3. Through actual deficiency in iodine intake, *e.g.*, through a lack of iodine in water.

When the gland is faced with a deficiency of iodine its parenchymal cells undergo hypertrophy followed by hyperplasia. It would appear from the work of Marine,[13] that during hypertrophy the amount of colloid is increased, but with no concomitant increase in its iodine content. The administration of iodine at this juncture causes a marked involution of the parenchymal cells but effects no reduction in the amount of colloid. If no iodine be given and the gland is allowed to atrophy, restoration to a normal functional state by means of iodine therapy becomes an impossibility. The prophylactic use of iodine in the prevention of the development of simple goitre in children proves the importance of the presence of iodine in the thyroxine molecule.

The question arises, if atrophy is the pathological end result of iodine lack, why is myxœdema not apparent as a clinical entity in these cases? There is abundant experimental evidence to show that there are no great changes in the basal metabolic functions of these cases. If the basal metabolic rate is not lowered, thyroxine, minimal in amount though it be, must be present in the blood.

It is at certain definite landmarks in the life cycle, puberty, pregnancy, or during periods of excessive metabolism, as in fevers, that simple colloidal endemic goitre appears, and it would seem therefore that during periods of normal energy exchange only an extremely small amount of iodine is necessary. Had the organism no periods of increased metabolic activity

to pass through it may be that there would be no development of colloid goitre. It is also clear that with increasing age there is a progressive decrease in the demand for thyroid secretion by the organism, and, with this, there is a lessened need for iodine and at times an apparent inability of the tissue cells to utilize iodine. This would to a certain extent explain why iodine therapy in cases of simple goitre, that is without any hypothyroidism, is of value for children and of rapidly decreasing value in patients over 20 years of age.

That iodine treatment is of definite, if only temporary, value in hyperthyroidism has been proved histologically and clinically. Rienhoff[17] has reported on the histological changes in the thyroid gland in cases of exophthalmic goitre before and after the administration of iodine in the form of Lugol's solution (ten minims, t.i.d.). The changes effected during treatment were briefly as follows:— (1) There was an increase in the gross size and appearance of the gland. (2) There was decreased vascularity of the gland; the blood and lymph vessels appeared collapsed. (3) There was a very marked increase in the colloid, this being evident both micro- and macro-scopically. (4) Increase in the fibrous stroma. (5) Epithelial cells assumed the flat cuboidal form, or in some areas were of the low columnar type, in contrast to the high columnar type in hyperplasia. There is therefore a distinct histological change in the gland which is evidence of a return to a colloid or resting state which approximates the normal. In a word, one has passed from the histological picture of glandular activity, *viz.*, columnar cells with large clear nuclei, dilated vessels, scant colloid, papillomatous ingrowths of the acini and many mitotic figures, to one of glandular rest, *viz.*, cuboidal cells, pycnotic nuclei, increase in connective tissue, decreased vascularity and abundant colloid. These later changes are also invariably associated with clinical improvement and a lowered basal metabolic rate. But such improvement is temporary and is merely a means to an end, namely, to prepare the patient for operative treatment. As to why iodine should have no lasting results in hyperthyroidism is just as inexplicable to-day as is its failure in the treatment of simple or endemic goitre in adults.

Plummer's two-product theory.[16] — Plummer's two-product theory was the result of his critical examination of exophthalmic goitre, in which he compared the intensity of what is called hyperthyroidism (*vide* basal metabolic rate) with that of the general ocular and nervous symptoms. He noted that the basal metabolic rate may be high when the latter signs were almost in abeyance. Plummer suggested that we have in exophthalmic goitre a hyperfunctioning gland which produces thyroxine in excess and which also produces a toxic substance. He further suggested that this toxic substance is thyroxine poor in iodine, and that the iodine medication results in the formation of a normal or physiological thyroxine, which restores normal function. But against such an hypothesis is the fact that the continued use of iodine is without avail, the pathological condition again becoming evident in about four to six weeks. In this connection it should be recalled that earlier ideas of the etiology of exophthalmic goitre presupposed either a neurogenous or a thyrogenous factor, or both. Cannon[6] is stated to have produced exophthalmos in dogs by joining the phrenic nerve to the cervical sympathetic, the continued periodic stimulation of the thyroid by respiratory impulses being the causative factor in producing the condition. This work has never been successfully repeated, otherwise the neurogenic hypothesis would have had a certain modicum of experimental support.

What is the mechanism whereby iodine brings about the remission? Plummer suggested three possibilities: (1) complete iodinization of the thyroxine molecule in the tissues of the body; (2) complete iodinization of the thyroxine molecule in the thyroid; (3) blocking of the thyroxine discharge from the gland, which may be due to a high concentration of iodine in the blood that tends to bring about a reversal of the normal mechanism of absorption and discharge.

The first possibility is unlikely, the second is less unlikely, and the third, the prevention of the excessive discharge of presumably abnormal thyroxine, is more unlikely, because the administration of iodine in large doses does not interfere with the discharge of thyroxine in normal persons. It is of interest to note that the feeding of thyroid gland to normal persons produces hyperthyroidism, evidenced by an increase

in the basal metabolic rate and by ocular and nervous symptoms, that this is not cured or even helped by iodine, and further to note that iodine does not affect the basal metabolic rate in normals.

THYROTOXICOSIS

It has been definitely affirmed by several investigators that some product of thyroid activity leaves the thyroid gland by way of the lymphatics. This secretion which can be seen passing from the lumen of the follicle to the thymus by the thyro-thymic lymph system (discovered and described by Sir Astley Cooper, 1832), carries *no* iodine; it is entirely different, both chemically and biologically, from iodo-colloid (Williamson, Pearse and Cunnington[25]) which does not leave the gland by the lymphatics but by the bloodstream (Hicks[11]). This secretion, a normal parenchymatous product, is a lymphogenic substance which thyroxine, the iodo-colloid product, is not. It has been shown that this secretion can stimulate the production of lymphocytes throughout the thyro-thymic lymph tract. And further it has also been shown experimentally that this lymphogenic secretion is responsible for the toxic condition in exophthalmic goitre and would thus correspond to the iodine-poor thyroxine suggested by Plummer.

Experimental proof of the relation of thyrotoxicosis to this lymphogenic secretion has been shown as far back as 1912 by Bircher[4] who produced exophthalmos, goitre and tachycardia in dogs by peritoneal transplantation of *thymus tissue* from cases of Graves' disease. Neither normal thymus tissue nor the lymphogenic secretion while in the follicles of the thyroid will produce such a result. These workers state that the secretion must be caught in transit from the thyroid to the thymus if it is to produce thyrotoxicosis, all of which would support the conclusion that thyrotoxicosis is due to a failure of the lymphatic endothelium of the thymus and thyroid to effect the natural detoxication of the lymphogenic secretion produced by the thyroid. Further, Halstead[8] has clearly shown that thymectomy is of value in alleviating the symptoms and signs of Graves' disease, which we may presume is due to destruction of the lymphatic routes and ultimate destruction of the thyroidal seat of origin of this secretion.

But all this still leaves unexplained the mechanism of the production of an iodineless thyroxine or a toxic substance in the thyroid. Theories of the derangement of natural detoxication mechanisms as a means of explaining the failure of normal function in the mammalian organism have justly been regarded with a certain suspicion. All that the experimental data can allow us tentatively to conclude is that toxic goitre may be due to a substance formed in the thyroid gland which is eliminated by the intrathyroideal lymphatics, and which may be a de-iodinized thyroxine or a body other than thyroxine, such as that which goes by the name of thyrotoxine. While it is admitted that one's knowledge of the cause of thyrotoxicosis is not greatly advanced by such results, yet a clear statement of experimental findings is infinitely more illuminating and suggestive than a statement to the effect that "the basis" of the various causative factors "is a special thyroido-sympathetic neuro-endocrine predisposition." (Schteingart, *Rev. of Sud. Amer. J. de Med. et de Chir.*, 1931).

THE RELATION OF THE THYROID TO OTHER ENDOCRINE ORGANS

Experimental work on the thyroid and pituitary glands has shown that there is a close relationship between them. It would seem that they do not function altogether independently of each other and as a consequence of this it is difficult to determine which gland is immediately responsible for any alteration in the normal function which has been induced by a pathological or experimental interference affecting one of them.

The interdependence of thyroid and pituitary.—Removal of either the thyroid or the anterior portion of the pituitary always results in a retardation of growth. Does this mean that both glands play a part in the control of growth or is it that the result is essentially due to alteration in the function of one gland only? For example, if the thyroid only functions by reason of stimuli received from the pituitary, then removal of either would give pathological results. Which one then is essentially the seat of the elaboration of the growth promoting hormone? Or perhaps both produce growth hormones which control function in different structures, the thyroid acting upon nerve tissue, the pituitary on bone. Or it may be that the pituitary, as well as controlling to a certain

extent growth, also has an independent action on the thyroid.

Experimental work has shown that removal of the thyroid results in hypertrophy of the pars anterior of the pituitary, and tends to the conclusion that pituitary secretions do definitely affect thyroid function. It has been shown (Allen: Smith, 1915) that removal, in the late egg stage, of the ectodermal bud destined to form the anterior, intermediate and tuberal lobes of the hypophysis of the tadpole, results in a failure to undergo the normal development of metamorphosis. Further experimentation showed that the injection of a suspension of the whole anterior lobe of the pituitary of the ox had a restorative effect upon the thyroid, bringing about a normal thyroid structure, there being no hyperplasia with increased dosage. It was also shown:— (1) that extracts from the central portion of the anterior pituitary produced enlargement and hyperplasia of the thyroid with more rapid metamorphosis, while, (2) extracts from the peripheral and ventral portions did not restore the gland, nor did they cause any hyperplasia. These latter extracts, however, gave a more marked stimulus to general body growth than did the extracts from the central portion of the lobe. Uhlenhuth and Schwartzbach[23] have shown that increased activity of the thyroid in normal larvæ at the time of metamorphosis is due to its stimulation by the anterior hypophysis. These experiments would go to show that the anterior lobe of the pituitary produces two hormones, one which affects general body growth, the other which stimulates the thyroid.

The effect of these extracts on metamorphosis.—Tadpoles from which the pituitary has been removed never metamorphose; they more slowly reach the size at which the normal tadpole metamorphoses. Restoration of thyroid structure by anterior pituitary extracts resulted in ultimate metamorphosis. In those cases where enlargement and hyperplasia of the thyroid were produced, metamorphosis took place more rapidly than with structurally normal thyroids. The controls in which the thyroid had previously been removed showed no signs of metamorphosis after injection with pituitary extracts; this proved that these extracts had no direct action upon the body tissues. Similar ideas and conclusions have been drawn from work on mammals. Smith and others have shown that in rats hypophysectomy performed shortly after weaning produced a distinct decrease in the size of the thyroid, with a diminution in colloid content, a flattening of the cuboidal cells with subsequent desquamation and a shrinking of their cytoplasm. Restoration of such thyroids could only be accomplished by intramuscular implantation of fresh hypophyses of other rats, feeding with pituitary and saline extracts being of no value.

The action of the thyroid on the suprarenals.—The effect which the thyroid has on the suprarenals would appear to be that of an exciter of chromaffine tissue, of tissue having a neural crest origin. Reference has already been made to the action of thyroid on the sympathetic. On comparing thyroid and adrenalin action one sees that both produce certain similar effects, namely, a lowering of the threshold of sugar assimilation, a widening of the pupils, exophthalmos, and tachycardia. Because of such activity, Falta and Eppinger state that the thyroid acts synergetically upon the suprarenals.

Interaction of the thyroid with the pancreas.—It is stated that glycosuria resulting from depancreatectomy is diminished and may finally disappear when the thyroid is removed. It is also stated that removal of the pancreas results in an increase in the amount of colloid in the vesicles of the thyroid.

The relation between the thyroid and the generative glands.—Removal of the thyroid in mammals leads to degenerative processes in the ovaries. The Graafian follicles become atrophied prematurely. The animals are often sterile; the mammary glands remain undeveloped and supply but little milk. In pregnant rabbits removal of the thyroid often causes abortion to take place. According to Herring, in rats, the effect of thyroidectomy upon sexual functions is not so marked: in young dogs, puberty is not delayed and the heat cycle of the mature animal is only a little prolonged.

It is manifest even from such a brief discussion as this how deeply the thyroid gland is involved in the control of endocrine function within the human organism, in the regulation of general body growth, and in the proper functioning of the higher nerve centres. The manifold questions which continue to arise with regard to its function are the outcome of its complex interrelation with almost every tissue

in the body. The question as to whether the causative factor which produces increased activity of the gland, as seen in hyperthyroidism, is neurogenous or not and is distinct from that which causes the signs and symptoms of thyrotoxicosis remains for further investigation.

The physiology of the endocrines has altered our outlook on many of the problems which have to be faced both by the scientist and the clinician. It is clear that if we are fully to understand the complex function of, and even attempt to classify, the various types of thyroid disorder with which the clinician is faced, it must be through a correlation and correct interpretation of all the experimental data at our disposal. The application of scientific knowledge to clinical medicine and the value of scientific and clinical collaboration are strikingly shown by the present day treatment of abnormal function of the thyroid.

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INJURIES OF THE CRUCIAL LIGAMENTS OF THE KNEE-JOINT, WITH A NEW METHOD OF OPERATING FOR THE REPAIR OF THE POSTERIOR LIGAMENT

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THE mechanism of the crucial ligaments is one of the most beautiful in the human body. These ligaments are somewhat mysterious to those who find it hard to remember which is which, and how they act. There should be no difficulty about this if their attachments to the tibia and femur are understood, and if one remembers that the terms anterior and posterior refer to their relative position on the tibia. Viewed from the side they form an "X", whence the name crucial or cruciate.

The anterior crucial ligament is attached to a depression in front of and close to the spine of the tibia, and to the medial side of the lateral condyle of the femur near the posterior border. It thus runs backwards, upwards and laterally, and serves in the main to prevent the tibia from slipping forward on the femur. The posterior crucial is shorter, but stronger, and runs from the depression behind the tibial spine close to the popliteal notch, to the lateral side of the medial condyle of the femur at its anterior part. It runs forwards, upwards and medially, and prevents the femur from slipping forward on the tibia. Both assist in preventing external rotation of the femur on the tibia, the anterior ligament by checking backward displacement of the lateral condyle, the posterior by checking forward displacement of the medial condyle.

One fact of interest in the anatomy of the knee-joint is that while the synovial membrane invests these ligaments in front they are actually situated outside the synovial cavity.

The loss of either or of both of these ligaments leads to very severe impairment of the joint, for no other structures share in the control of this backward and forward joint-play. In the examination of a knee-joint for possible crucial injury one seeks for this play. If when the knee is extended the tibia can be displaced forward the anterior ligament is damaged; if when the knee is flexed the femur can be displaced forward the posterior is at fault.

The surprising thing, in view of the many

severe injuries to which the knee is subject, is that permanent damage to the crucial ligaments is relatively so uncommon. It seems probable that many of the cases in which the ligaments show signs of damage are associated with a tearing-off of their bony attachments and that this tends to repair if adequate rest be given.

In 1913 Sir Robert Jones and Alwyn Smith[9] published a series of cases of complete dislocation of the knee where the patients made good recoveries after prolonged fixation, some of them returning to hard manual work. Such injuries should undoubtedly be given the benefit of complete immobilization in the straight position with no attempts at active or passive movements for a period of from two to four months, followed by the use of a knee-cage to steady the knee when walking.

A case reported by Richards[14] in 1924, in which a radiogram indicated a notch at the site of the femoral attachment of the posterior crucial illustrates a less usual type of injury. A good result was obtained following manipulation and subsequent fixation.

It is in cases where the injured crucial ligament has not had adequate treatment, or has failed to respond thereto that the difficult problem arises of improving the condition by operative measures. The early operations attempted to repair the ligaments by simple suture, absorbable and non-absorbable materials being used. This was combined with plication, reefing (Corner), wire loops (Corner), and silk ligament substitution. In 1898, Battle[1] sutured the crucial ligaments as part of the procedure in the open reduction of an irreducible dislocation of the knee-joint. The result was considered sufficiently satisfactory to prompt his showing of the case at the Clinical Society of London in 1900. Two years later Mayo Robson[15] reported to the same Society an operation he had undertaken in 1895 for suturing of these ligaments. He found them severely damaged, being torn from their upper attachments, and used catgut for the repair which was apparently successful. Sir Robert Jones in 1900 freshened the ends of a frayed anterior ligament and united them with catgut. Subsequently, on considering the matter, he was inclined to attribute the recovery in stability to the prolonged rest which followed the operation rather than to the operation itself. Pagenstecher[12] later recorded three cases operated upon — two anterior and one posterior. Pringle[13] reported two cases of operative repair of the anterior crucial ligament, in one of which there was avulsion of the spine of the tibia. He discussed the mechanism of the injury with a review of this phase of the literature. Goetjes[6] collected cases of this injury reported up to 1913, thirty in all, of which twelve underwent open operation. In five of these attempts were made to suture the ligaments and in a like number attention was given to an avulsion of the tibial spine.

It is difficult to see how suture alone can accomplish a great deal; when the ligaments are found much frayed or torn a simple repair of sufficient strength to withstand the strain is too much to hope for. The answer has come through the use of fascia and tendon, in which field Hey Groves, Alwyn Smith, and Gallie and LeMesurier have all made valuable contributions. Space does not permit a detailed review of their work, but their published articles merit careful scrutiny.

In 1917 Hey Groves published a preliminary paper[7] and three years later[8] reviewed the whole subject in an excellent article. He described an ingenious method devised by him in which he used the ilio-tibial band to construct a new anterior ligament and the tendons of the semitendinosus and gracilis to replace the posterior. He exposed the joint by chiselling off the tubercle of the tibia and turning the patella upwards. In the earlier operation for the anterior crucial the ilio-tibial band was detached below, but in his later technique it was divided above and left attached to the tibia, thus providing a firm anchorage for it. In the operation for the posterior crucial the semitendinosus and gracilis were drawn into the joint through the posterior ligament; in this respect, as Gallie has pointed out, they appeared to lack adequate fixation.

In 1918 Alwyn Smith[16] described a modification of the operation for the repair of the anterior ligament, using the high division of the ilio-tibial band as above described. He approached the joint by splitting the patella and added a reinforcement of the internal lateral ligament. In 1926 Edwards[3] reported an operation which he had carried out experimentally on the cadaver, in which the joint was opened by a horse-shoe incision, throwing up the patella with the tibial tubercle. The gracilis and semitendinosus were freed from their insertion, their upper attachment being retained. These tendons

were then introduced into the joint by a tunnel extending through the medial condyle where they separated to leave the joint by diverging tunnels one in each tuberosity of the tibia. This operation does not appear to reproduce the course of the ligaments with sufficient faithfulness to serve their purposes.

Gallie and LeMesurier[5] in 1927 presented an interesting modification for the repair of the posterior crucial ligament, using the split-patella approach to the knee-joint. The semitendinosus was reached by a long posterior incision which also exposed the popliteal space. The semitendinosus was divided in the thigh and its tibial insertion retained for firm anchorage. The tendon was then drawn backwards through a drill-hole extending from the posterior surface of the head of the tibia close to the mid line to a point close to the insertion of the semitendinosus. The free end of the tendon thus protruded in the popliteal space. A specially prepared bodkin carrying the free end of the tendon was then thrust through the posterior ligament of the joint and drawn into the interior of the joint. The end of the tendon was then led out through a drill-hole carefully placed, extending through the internal condyle to the exact point within the joint which had been punctured by the bodkin. This was close to the femoral insertion of the posterior crucial ligament. With the knee-joint in full extension the tendon was pulled taut and its end sewn to the internal lateral ligament. The result was satisfactory and a great improvement on the original condition. This operation is, to my mind, a distinct advance on that of Hey Groves, in that it secures a much firmer tibial attachment for the artificial ligament.

Eikenbary[4] faithfully reproduced the course of the ligaments in an operation which he proposed in 1927, but which does not appear to have been put to the test in the living. A long incision was made through the capsule to the median side of the patella, including all capsular layers. The patella was then everted on to the lateral condyle, exposing the joint. For the anterior ligament he drilled through the front of the crest of the tibia entering the joint close to the anterior surface; the femur tunnel ran from a point close to the mid-line in front, immediately above the cartilaginous surface for the articulation with the patella, to the point of attachment of the anterior ligament on the medial side of the lateral condyle. For the posterior ligament the tunnel entered the tibia in front and emerged on the superior surface close to the posterior margin. The drill-hole through the femur corresponded with that for the anterior ligament, but emerged within the joint at the point of attachment of the posterior crucial to the lateral side of the medial condyle. Free strips of fascia lata were drawn through the appropriate tunnels and the ends were sutured firmly in position.

Ludloff[11] used a strip of fascia wrapped around a long stout silk thread to repair an anterior crucial. In this the joint was opened by an incision similar to the above. Holes were drilled through the medial tuberosity and through the lateral condyle. The cord of fascia was drawn through these tunnels but the ends were not sutured, the author considering that it was important to allow the newly formed ligament to move in the drill hole. I find it difficult to understand how stability could thereby be obtained. Cubbins[2] and his co-workers in a recent article report two cases in which some interesting modifications are introduced, including the use of biceps tendon to refashion the posterior crucial. A twelve inch postero-lateral incision gave access to the vastus lateralis and the biceps, the fascia of which was used, anchored by their lower attachments. The joint was exposed by a long incision medial to the patella. Holes were drilled as follows:—

1. Through the medial condyle, entering at its upper and anterior portion above the cartilaginous line and then running obliquely back and down to the intercondyloid notch at the normal insertion of the posterior crucial.

2. Through the medial tuberosity of the tibia emerging just in front of the tibial spine.

3. Through the posterior portion of the lateral condyle from just above the attachment of the collateral fibular ligament to the point of femoral attachment of the anterior crucial.

The vastus lateralis fascia was drawn through the lateral condyle, then downwards and forwards through the medial tuberosity to reproduce the anterior crucial. The biceps was carried beneath the tendon of the popliteus, then through the posterior ligament into the joint

and out through the medial condyle. All free ends were sutured into a specially prepared osteoperiosteal bed. Cubbins deviates from the usual practice in that, in closing the wound, he leaves a space opposite the articulation from which extravasated blood and synovial fluid can escape. In two cases in which this operation was undertaken the results were reported as not perfect but the joints were strong and serviceable. In one case the operation was done in one stage, two stages being used for the other.

It will be noted that the operations heretofore described involve an extensive exposure of the knee-joint, a procedure not without risk. The opinion of Jones and Lovett[10] as expressed in their recent Textbook on Orthopedic Surgery may be quoted in this connection:—

> In old flail knees, with marked functional defect, recent attempts have been made to restore function by reconstructive operations (Hey Groves and Alwyn Smith). The writers have examined several of these cases without having seen a perfect result, but several have been much improved. The operations have been unusually grave and require the highest craftmanship and the strictest technique and should never be undertaken without a sense of grave responsibility.

I am inclined to think that few will quarrel with this pronouncement, and more could be said on the subject.

Now it may be pointed out that while the crucial ligaments are in a sense within the knee-joint they are actually extra-synovial, as in fact is the intercondyloid space. The basis of the present contribution is that it describes the successful restoration of a ruptured posterior crucial ligament by a much simplified operation, one which takes advantage of this anatomical fact and which thereby obviates the exposure of the synovial cavity. I have not yet had an opportunity to apply the same principles to the repair of an anterior crucial but believe they are applicable, as will be mentioned below.

CASE REPORT

On June 2, 1928, a train, consisting of an engine, tender and two cars, was swept off the rails by the force of a tornado and overturned in the ditch. The train baggageman, F. C., aged 45, sustained among other injuries a compound dislocation of the left knee; the tibia projected backwards through the lateral side of the popliteal space. He was given emergency treatment at a small local hospital, where the dislocation was reduced under a general anæsthetic. The leg was placed in plaster and so maintained for some weeks. An x-ray taken later revealed no definite fracture but the spine of the tibia was indistinctly outlined. The man was fitted with a cage which afforded some support, but even with the brace he had great difficulty in getting about. He was referred to me on this account by his employers on February 25, 1929, when he complained of pain in the knee and of being unable to bear weight on his left leg without the knee giving way.

Examination showed a somewhat atrophied thigh and leg on the injured side. There was a healed scar in the popliteal region to the lateral side of the mid-line, the site of the compounding wound where the dislocation occurred at the time of the accident. The knee was stable in a lateral direction and there was no abnormal forward play of the tibia on the femur proving that the

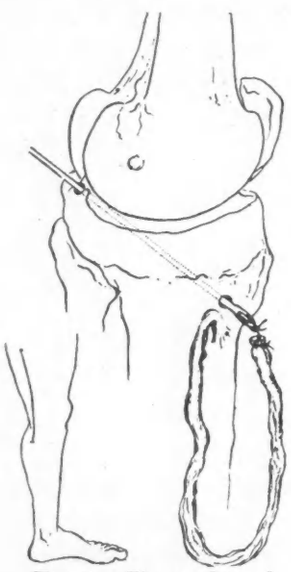

FIG. 1.—The tendon of the semitendinosus freed above but attached at its insertion is drawn through the tunnel in the tibia. The small circle on the medial condyle indicates the site of the drill-hole through the condyle. (See Fig. 2).

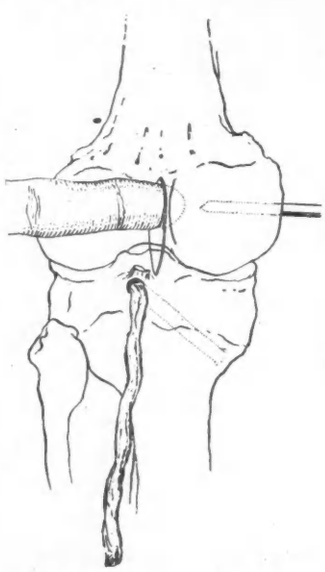

FIG. 2.—Shows the tendon of the semitendinosus protruding in the popliteal space. Incision in the posterior ligament admits the finger to the intercondyloid space as a guide in drilling through the medial condyle.

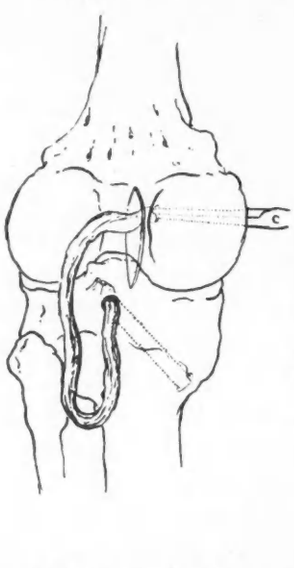

FIG. 3.—Forceps introduced through the drill-hole in the medial condyle to grasp the end of the tendon in the intercondyloid space.

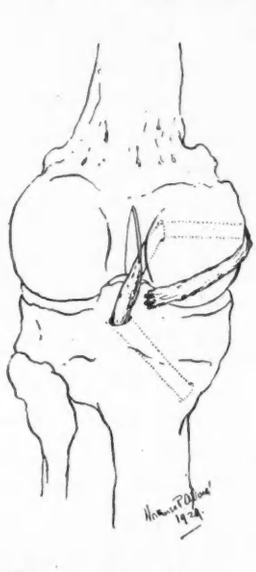

FIG. 4.—Completion of the tendon substitution. The tendon is sutured as it emerges from the condyle and to the back of the tibia near the mid-line.

anterior crucial ligament was intact. When weight was borne on the partly flexed knee the femur would slide forward on the tibia for a distance of nearly an inch, indicating loss of action of the posterior crucial ligament.

Operation.—On June 21, 1929, operation was undertaken under a general anæsthetic. The patient was placed in a prone position. A long incision was made on the postero-medial aspect of the knee, extending upward along the course of the semitendinosus tendon and carried for a short distance below the knee. The wound was retracted in the region of the joint to give access to the insertion of the semitendinosus and to the popliteal space. The tendon of the semitendinosus was isolated and detached from the muscle to give a maximum of length. The insertion was identified and preserved. The tendon was then scraped to roughen the surface. By flexing the knee the inner head of the gastrocnemius could be lifted up by the finger and retracted laterally, thus giving access to the popliteal space in the mid-line without exposing the popliteal vessels. A drill one-quarter inch in diameter was then introduced into the upper posterior border of the tibia in the mid-line immediately below the normal attachment of the posterior crucial ligament. The drill was directed towards a point immediately above the insertion of the semitendinosus and the drill hole completed.

The end of the prepared tendon was then drawn through the drill hole from front to back by means of a probe to which it was fastened (see Fig. 1).

A vertical incision was made through the posterior part of capsule of the joint large enough to admit the finger into the intercondyloid space. The posterior crucial ligament was found to be detached from the condyle. A drill was introduced through the medial condyle at a point one-half inch above the joint line and at an equal distance from the posterior border of the condyle. The finger tip introduced into the intercondyloid space indicated the point of attachment of the posterior crucial ligament to the lateral aspect of the medial condyle. Towards this point the drill was directed to emerge in the space (see Fig. 2). The free end of the tendon was then introduced into the intercondyloid space and fished out through the drill hole in the condyle by means of fine forceps (see Fig. 3). This left a length of tendon which was swung around behind the medial side of the joint. The end was anchored with chromic catgut to the periosteum at the upper end of the tibia near the mid-line, and sutures were also placed to fasten the tendon at its emergence from the condyle (see Fig. 4). In carrying out these stages the tendon was made as taut as possible, a slight degree of flexion of the knee helping somewhat. The opening in the capsule was closed and the wound sutured in two layers. At the completion of operation the stability of the joint was greatly improved. A plaster of Paris cast was applied from the upper third of the thigh to the lower third of the leg with the knee in slight flexion.

His convalescence was uninterrupted. On the day following operation the temperature touched 100.4°, remaining under 100° during his subsequent stay in hospital. On July 3rd the cast was cut down for the removal of sutures and a fresh cast applied. The wound healed by primary union and there was no trace of effusion in the joint. He was then allowed to bear weight with the protection of the plaster and was discharged from hospital on July 15th. He was given a knee cage with a check to prevent flexion beyond thirty-five degrees. The range of motion was gradually increased until a full range was permitted.

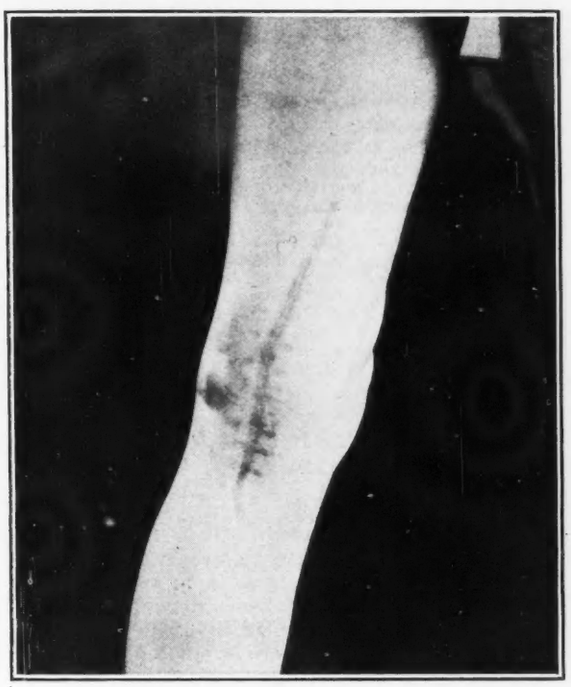

FIG. 5.—Single incision on postero-medial aspect of knee. Old scar at lateral side of popliteal space is site of compound dislocation.

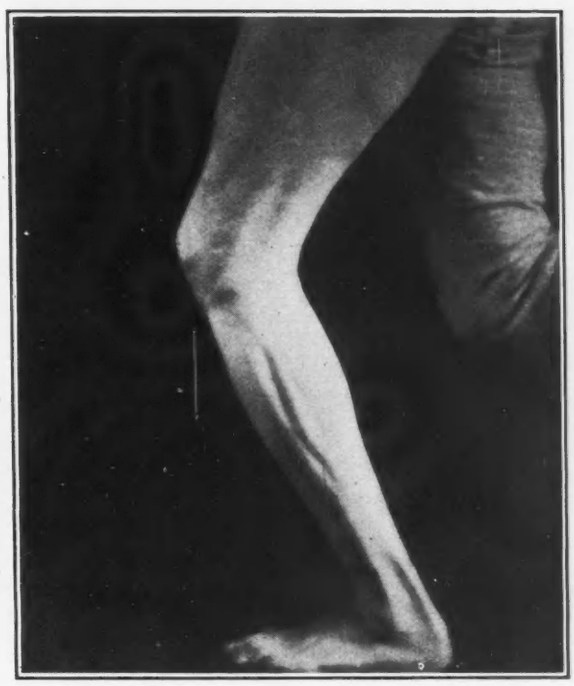

FIG. 6.—Patient bearing full weight on flexed knee, showing stability of knee-joint after operation for repair of posterior crucial ligament.

One night, some three months after the operation, a fire broke out in his home and he assisted in carrying the furniture down a flight of stairs. In the excitement he forgot to apply the brace, but the knee stood up well under this strain. He was allowed to return to his work as train-baggageman on November 3, 1929. In view of the severity of his work I advised him to continue the use of the brace during the first winter, which he did.

He has remained at this work ever since without loss of time. I have since examined him at intervals and the result is most gratifying. He now has a stable

knee. In a recent letter dated February 24, 1932, he writes as follows:

"From the day of the operation I have not had any pain in my knee and I am so glad to say I have been working every day since I started without any tired feeling. I am working on a train employed as trainman or train-baggageman, lots of jumping on and off trains. I am not lame. It does not bother me a bit although I work twelve hours a day and every day except Sunday on a local train."

CONCLUSIONS

In presenting this description of the repair of a damaged posterior crucial ligament I believe the operation accomplishes the following:—

1. An accurate anatomical substitution of the damaged ligament, so placed and anchored that it fulfils the normal function of the ligament, in that it (a) checks the abnormal movement of the flexed femur on the tibia, and (b) checks the abnormal external rotation of the femur on the tibia.

2. The operation is accomplished by a single incision, and the popliteal space is reached without danger to the vessels.

3. The synovial cavity is not opened, and the risks of infection are thereby greatly lessened.

For the repair of the anterior crucial ligament I believe the same principles are applicable, and that this could be effected without exposure of the interior of the joint. With the finger in the intercondyloid notch as a guide, drill-holes could be placed through the lateral condyle to reach the point of attachment of the anterior ligament to the femur, and through the tibia from in front to reach the region of the tibial spine. A strip of fascia from the ilio-tibial band, retaining its inferior attachment, could be drawn through the condyle and through the tibia, thus accurately reproducing the course of the normal ligament.

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RADIUM POISONING.—James P. Leake, states that subsequent to the investigations of luminous dial painting, which had been sponsored by manufacturers and others, the Surgeon General of the United States Public Health Service held a conference on the subject, December 20, 1928, as a result of which an investigation was undertaken to determine the remaining hazards, if any existed, and means for prevention. On the basis of the results of this investigation it appears that it should be possible for the industry to be conducted with entire safety. Of the possible source of ingress of radioactive material (ingestion, skin absorption, and inhalation), massive ingestion by pointing the brush in the mouth has apparently been stopped. There is no evidence of skin absorption or of harmful alpha, beta or gamma radioactivity from sources outside the body. The inhalation of radioactive material as dust or as gaseous emanation is more difficult to control and deserves especial emphasis. The amounts of radium found in the workers are small, relative to those which have previously been noted in serious or fatal cases of radium poisoning, but the fact that this is true in the few workers examined does not give assurance of safety if a large number were employed or if the present exposure continues over a longer period. Even more than in other dust hazards, such as those of silica and lead, in which the effects are slow in appearing, the inhalation of radium dust should be kept below the point of equilibrium between intake and elimination, because great harm may be done before the condition becomes clinically noticeable or detectable by methods which at present can be easily applied. Though there is evidence, in this investigation, of accumulation of radioactive material even under the improved conditions which have obtained since 1926, there is no indication that the accumulation since that date has in any individual case been sufficient to injure the worker. The evidence does, however, show the necessity for a still further and more marked reduction of the exposure, not only barely to prevent further accumulation, but also to provide a sufficient factor of safety under varying conditions and varying susceptibilities.—*J. Am. M. Ass.*, 1932, **98:** 1077.

FOUR CASES OF OSTEOGENESIS IMPERFECTA IN ONE FAMILY*

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A LARGE number of cases of this disease have been reported. This small group is of interest because the cases are all in children of the same family, because of the marked degree of deformity in two cases, and because of a rather peculiar family history. A short summary of the case reports follows.

CASE 1

H. B., male, aged 6, was admitted to hospital on June 28, 1930.

Present illness.—At the age of 10 months the child fell from a chair to the floor and fractured the left femur. The fracture was reduced and a cast applied. This was kept on for six months. A short time after removal of the plaster the boy fell again, fracturing the left femur at or near the site of the previous fracture. No treatment was given and non-union resulted. In December, 1929, the boy slipped on the floor and fell, fracturing the right femur. This was untreated and healed in malposition.

Personal history.—Other than whooping-cough and occasional sore throats the patient had had no acute illnesses. During infancy he received no orange juice or cod liver oil, and had had rather a poor diet until he received the ordinary family meals. He is the eldest child of the family.

Present condition.—The boy was fairly well nourished but rather pale; his skin was clammy. The chest was asymmetrical and there was flaring of the costal margins and depression of the sternum. The head was normal; the scleræ were blue; the upper extremities were normal. There was an ununited fracture in the middle third of the left femur and there was mal-union in the upper portion of the right femur. Unfortunately, a complete x-ray study of the patient was not made. Plates of the lower limbs and pelvis show the presence of an ununited fracture with considerable overriding of the middle third of the left femur, the presence of at least one other healed fracture of the left femur, two mal-united fractures of the right femur, irregular epiphyseal lines and irregular shaped epiphyses especially of the femora. There was general bony rarefaction, except at the fracture sites. (Fig. 1).

Laboratory findings.—Blood calcium and phosphorus were normal; a secondary anæmia was present.

CASE 2

Eug. B., female, aged 3 years and 4 months, was admitted on July 28, 1930.

Present illness.—The first fracture was noticed when this child was 3 months old. Since then fractures have been numerous and there has been a gradually increasing deformity of the arms and legs. The fractures cause little pain or swelling. This child had never walked nor crawled. She received no treatment prior to admission.

Personal history.—Other than frequent attacks of gastroenteritis, she had had no acute illnesses. She was breast-fed for two months and was then placed on a diet consisting of a mixture of milk, cane sugar and water. At the time of admission she was receiving milk, bread, butter and potatoes. She had never received any orange juice or cod liver oil. She is the fourth child of the family.

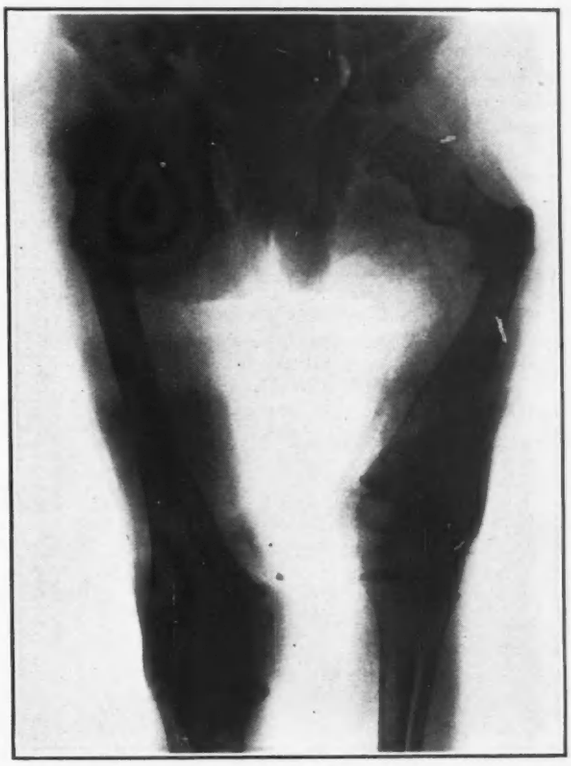

FIG. 1.—H. B. X-ray of pelvis and femora. There is an united fracture of the left femur, and above it a healed fracture. There is also a healed fracture of right femur.

Present condition.—A general idea of the child's appearance may be obtained from Fig. 2. The attitude is similar to that of a sitting Buddha with legs crossed in front of the body. The nutrition was good; the skin was sallow, cold and clammy. Beads of perspiration were usually present about the forehead. The lips and conjunctivæ were pale; the scleræ were bluish in colour. The head was large but there were no well defined bosses present. The chest was of the rachitic type with flaring of the costal margins, depression over the sternum, and beading of the ribs. The fingers were long, slender and pointed. The child was able to move the upper limbs, but the lower were fixed in the peculiar crossed attitude above noted.

The skiagrams revealed numerous abnormalities (see Fig. 3). The majority of the bones showed marked rarefaction, especially of the humeri and femora, with irregular patches of increased density. Many epiphyses

* From the Shriners' Hospitals for Crippled Children, Montreal Unit.

were irregular in shape and the epiphyseal lines were frequently narrow and irregular. There was marked bowing of the lower halves of the tibiæ and fibulæ. The pelvic brim was narrowed from side to side, the pelvis being somewhat of the osteomalacic type. The fractures were distributed as follows: right femur 3; left femur 3; right clavicle 2; right humerus 2 or 3; left humerus 3; right radius and ulna 1 each; left radius and ulna 1 each.

Laboratory findings were normal as regards blood Wassermann test; blood sugar, blood calcium, blood phosphorus. There was a moderate grade of secondary anæmia.

CASE 3

R. B., female, aged 2 years, was admitted on July 28, 1930.

Present illness.—The deformities commenced in this child at the age of 9 months and have been progressive. As in the previous case, the fractures caused little pain. Prior to admission she had received no treatment and had never walked or crawled.

Personal history.—Other than several attacks of gastrointestinal disturbances the child had had no acute illnesses. Her dietary history is similar to that of her sister (Case 2). She is the fifth child of the family.

Present condition.—The child maintained a sitting Buddha position, with almost complete absence of voluntary movements of all extremities. As in Case 2, this patient had a large head, rachitic chest, clammy sallow skin with free perspiration, long slender tapering fingers, and blue scleræ.

The skiagrams of this patient (Fig. 4) show almost the same abnormalities as do those of the preceding case, except that here there is no bowing of the tibiæ or fibulæ. There was general rarefaction, with irregular areas of ossification, deformity of the pelvis and deformed epiphyses and epiphyseal lines. The fractures were distributed as follows: right femur 4; left femur 3; right humerus 1; left humerus 1 (recent); left clavicle 1.

Laboratory findings.—The blood Wassermann test, blood sugar, blood calcium and blood phosphorus were normal. There was moderate secondary anæmia.

CASE 4

El. B., female, aged 6 years, was admitted on June 16, 1931.

Present illness.—In January, 1931, the patient slipped on the floor, falling on the buttocks and fracturing the right femur. The fracture was reduced and put up in plaster. She was crawling about at the end of 40 days. In April, she fell from a low stool, fracturing the left femur. On June 14th the right femur was broken at or near the previous fracture site, by lifting up the child's legs in order to change the napkin. This fracture had not been reduced.

Personal history—The patient during infancy had frequent attacks of gastroenteritis. The dietary history is similar to that of the other children. This is the second child.

Present condition.—The patient on admission was fairly well nourished, rather sallow and pale. The skin was clammy and she perspired freely. The fingers were long and tapering. The head was large, the scleræ were blue. The chest showed flaring of the costal margins. A slight Harrison's sulcus and depression of the sternum were present. There were obvious deformities of both upper femora.

The skiagrams of this patient (Fig. 5) showed the presence of less rarefaction than in the others, and the areas of increased density were confined largely to obvious fracture sites. There was some pelvic deformity; some of the epiphyses were irregular in shape and some of the epiphyseal lines were narrow and irregular. The number of fractures was smaller than in the two preceding cases and they were distributed as follows: right femur 2; left femur 1; left humerus 1; left clavicle 1 (?).

Laboratory findings.—Wassermann test, CO_2, blood sugar, chlorides, calcium and phosphorus were normal. There was moderate secondary anæmia.

GENERAL REMARKS ON THE FAMILY

There is no history of miscarriages or stillbirths and there are six children living. Four have been considered above. One other, a boy, the third child in the family, appeared healthy. He had no signs of old fractures clinically and did not have blue scleræ. The other, a girl, the sixth child, had a gastrointestinal upset of some weeks' duration when seen and the general condition, except for the deformities, was similar

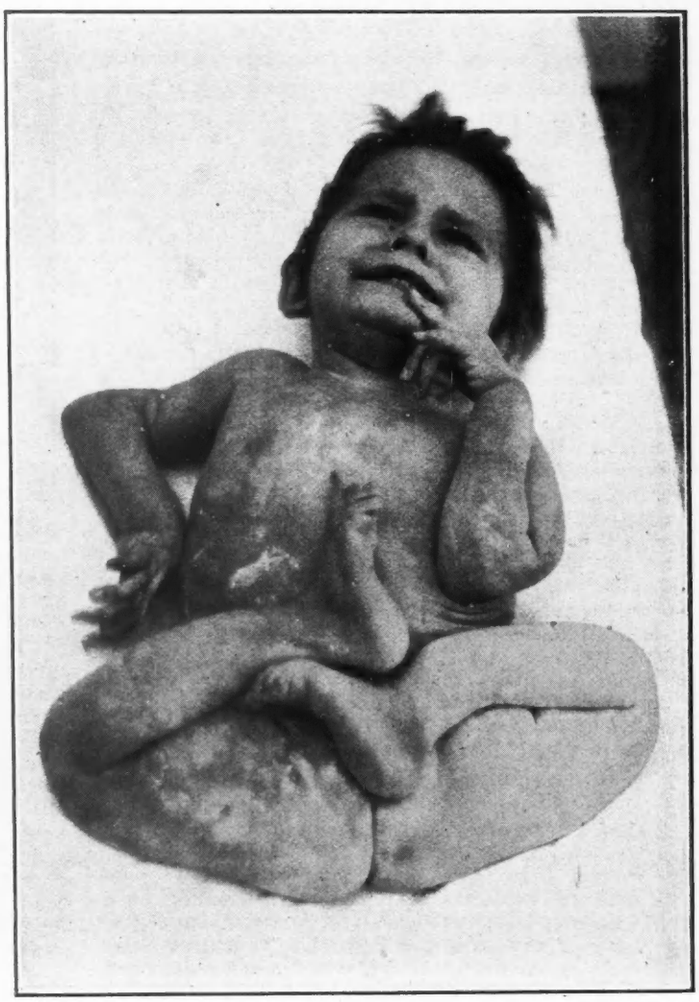

FIG. 2.—E. B. A photograph showing the normal attitude assumed by the child.

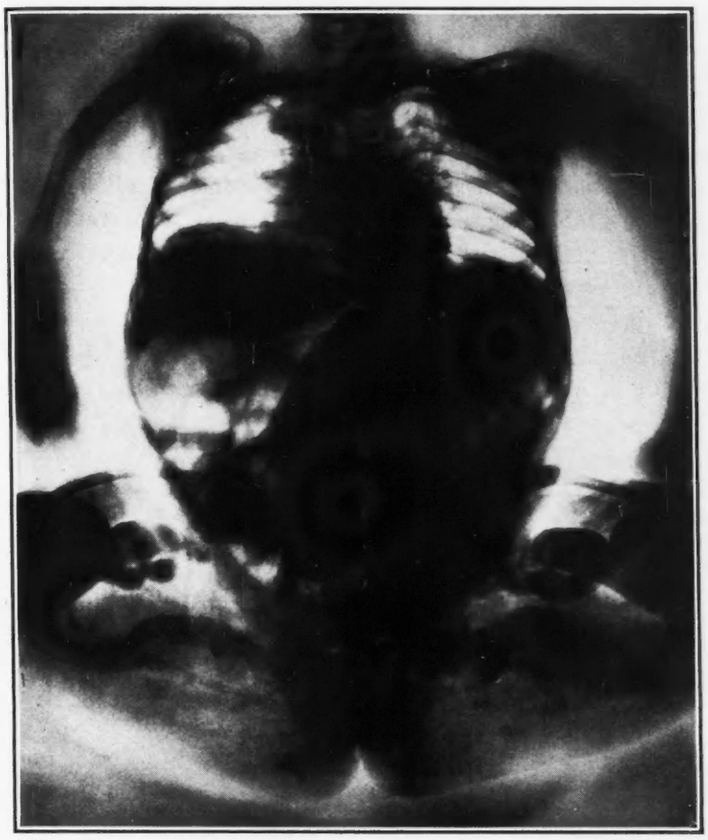

FIG. 3.—E. B. Skiagram of child in squatting position. Note flattening of the ribs, in addition to the other features mentioned.

to that of Rosienne (Case 3) and Eugenie (Case 2). There were no signs of fractures. There seemed to be slight bluish discoloration of the scleræ.

The mother was in poor health during all her pregnancies, but she never consulted a physician. She never had a fracture. She has no deformities of extremities and no deafness. Her scleræ are white. She has not noticed blue scleræ in any of her relatives. There is no history of repeated fractures in any members of her family, and there is no history of deformities at birth, except for one case of clubfeet in the child of a paternal aunt. There is a strong history of tuberculosis in the family. The mother is a blood relative of the father. The father has always been in excellent health and has spent most of the past 20 years in the woods. He has blue scleræ, but has no signs of old fractures clinically, nor does he give any history of fracture. He stated that none of his relatives have

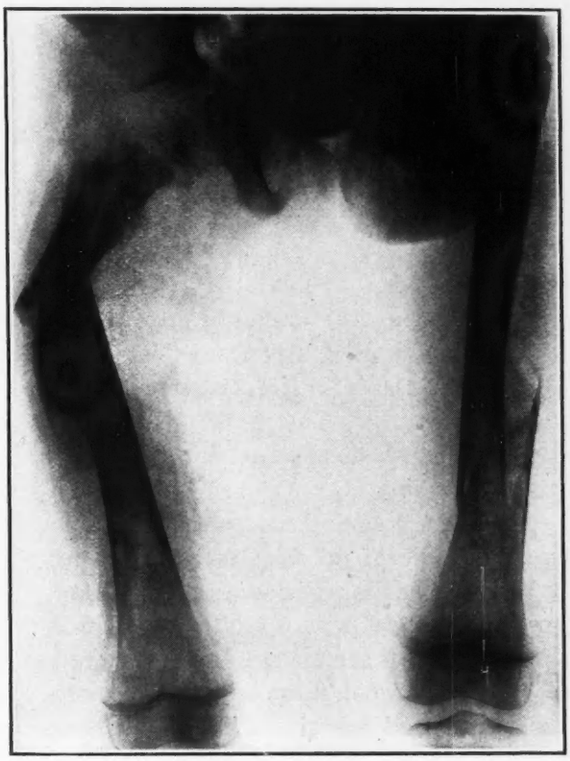

FIG. 5.—E. B. X-ray of pelvis and femora, showing fractures of both femora and pelvis deformity.

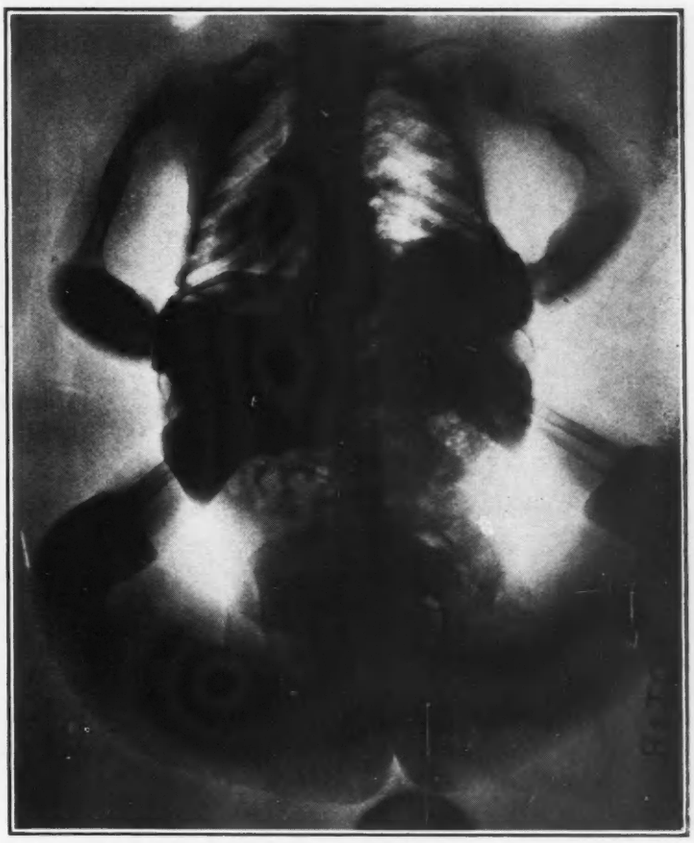

FIG. 4.—R. B. Skiagram of child in squatting position. Note flattening of the ribs, in addition to the other features mentioned.

blue scleræ. There was no history of multiple fractures obtainable. However, a brother of his father had three children all of whom died shortly after birth and all of them had severe deformities of the arms and legs. The sister of his father was Mrs. B's. maternal grandmother.

It is regretted that a more detailed and more reliable family history could not be obtained, but owing to the poor memory and powers of observation of those members of the family within reach, and the wide distribution of the remainder nothing more could be done.

The object of this paper is merely to put on record 4 cases of osteogenesis imperfecta in the same generation of the same family, all having blue scleræ and normal hearing, and to show the marked deformities that can result in neglected cases.

BLASTOMYCOSIS OF THE GINGIVA AND JAW

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BLASTOMYCOSIS involving the gum tissue or jaw is extremely rare. It may occur as a primary condition or as part of a general systemic infection. In reading through the reports of most of the published cases only one reference was noted where the blastomycetes were thought to have gained access by way of the gingival tissue (Moore[1]). Only 5 cases of blastomycosis of the tongue have been reported in all the literature. The fifth case was that of a primary condition reported by Childrey and New.[2]

Blastomycosis was first observed in Baltimore in 1894 by Gilchrist,[3] and since that time cases have been reported from all parts of North America, but it appears to be of more frequent occurrence in the central States. Cutaneous blastomycosis is the commonest form of the disease. Systemic blastomycosis was first described by Walker and Montgomery[4] in 1902. The disease more often affects males; 34 of Stober's[5] series of 36 cases were in men. The majority of his cases were in foreigners engaged in hard manual labour and living in unhygienic surroundings. The disease is more frequently seen during the third and fourth decades of life. Most writers agree that trauma, even though only a slight abrasion, may be a predisposing factor to infection, either by affording an opportunity for direct inoculation or by producing an area of lowered resistance where an already existent infection may gain entrance. Stober believed that this disease was probably contracted by the inhalation of dust particles carrying the organism. The respiratory tract is practically always infected in systemic cases .

Etiology

The causative organism belongs to the yeast family and may be readily demonstrated in the pus from epithelial and sub-epithelial abscesses and in the sputum of patients suffering from pulmonary disease. Montgomery and Ormsby[6] believe that dilution of the sputum or pus with a one to ten per cent solution of potassium hydroxide facilitates recognition. The organisms, which are found in pairs or in clumps, are doubly contoured, homogeneous, with a highly refractile capsule. Search for the blastomycetes must be made with a minimal amount of light entering the microscope, and they are more easily demonstrated in fresh material than in stained preparations. Stober experienced no difficulty in growing the organism on ordinary media, thus showing that it is not delicate in its nutritive requirements. The organism, when cultured, will grow at room or incubator temperatures. The blastomycetes in the tissues multiply by budding.

The cutaneous lesion develops as a papule, usually on the skin of the face, forearms, hands or legs. In a short time it becomes pustular and develops into an ulcer with a soft papillomatous floor. The border of the mature lesion is raised, irregular and indurated, resembling tuberculosis verrucosa cutis, and contains miliary abscesses. The lesion spreads by slow extension from the periphery.

Montgomery and Ormsby[6] have reproduced the disease in experimental animals, but practically all strains showed very low pathogenicity. The best results were obtained by intraperitoneal and intravenous injections. They believe that the mode of extension is by way of the blood stream instead of the lymphatics, just as in other pyæmias, and they were able to demonstrate the organism in sections from blood vessels in a number of instances and from the blood in two cases. Enlargement of the regional lymph glands is not usually a prominent feature. However, general enlargement of the lymph nodes is found in about one-third of the cases which come to necropsy.

Stober[5] reported two cases where blastomycotic lesions were found in the submaxillary, axillary and inguinal lymph nodes at necropsy. Montgomery and Ormsby report one case where there was an enlargement of both submaxillary glands. Hoffman[7] reported a case of chronic blastomycosis with involvement of the tongue and hard palate. Moore[1] reported a case of blastomycosis in a boy, seventeen years of age, who died from a brain abscess. He believed that his patient probably became infected through the mouth, as his trouble started in the region of his lower left unerupted third molar. After removal of this tooth the condition grew steadily worse, with abscesses forming in the left temporal region. This patient was in the habit of carrying a "splinter" of some kind in his mouth, and Moore believed that the infection had probably been introduced in this manner. The lesion in the mouth was not described. This case was the only reference made to blastomycotic infection probably gaining access through the gum tissue.

Childrey and New[2] pointed out that primary involvement of the tongue by the blastomycetes is probably of a more common occurrence than is generally supposed. They feel that the lesion might be mistaken for a syphililic lesion on account of the manner in which it responds to the iodides. This would also be true of a lesion involving the gingival tissue. The amount of dissemination of the disease depends upon the patient's resistance and the length of time the infection has been present. Any organ or tissue may be affected.

CLINICAL MANIFESTATIONS

In systemic blastomycosis the general symptoms are those of a chronic infection, irregular fever being a common symptom. Pulmonary symptoms are usually mild during the early stage of the disease and limited usually to cough with expectoration or a feeling of discomfort in the chest. Physical findings have not pointed to extensive lung involvement, except in a few cases in advanced stages, and are never commensurate with the extensive lesions found at autopsy. Areas of consolidation occur first as a rule in the upper lobes of the lungs, the right being involved three times as often as the left. Howes and Morse[8] found that the lungs were involved in 97 per cent of cases that came to necropsy. In reading over the published cases which came to autopsy no reference was found to a lesion involving the gingival tissue.

DIAGNOSIS

It may be extremely difficult to differentiate between tuberculosis and pulmonary blastomycosis on account of the similarity of clinical pictures in the two diseases. Examination of the sputum in most cases will give positive evidence of the condition present. Stober points out that blastomycetes should be looked for in those cases of suspected tuberculosis where tubercle bacilli are persistently absent. It must also be remembered that both diseases may be present in the same individual. The Wassermann reaction of the blood will serve to establish the diagnosis in those cases of syphilitic bone lesions, or gummata, which are apt to be confused with blastomycosis. Coccidioidal granuloma may be difficult to distinguish clinically from blastomycosis, but the former disease shows a greater tendency to lymphatic involvement. Definite differentiation may be made by the fact that the coccidioidal granuloma always reproduces in the tissues by endosporulation. Epithelioma may be confused with blastomycosis, but the microscopic examination should be the deciding factor in making the diagnosis.

PROGNOSIS

The prognosis in early cases of cutaneous blastomycosis is not especially serious, but in systemic cases it is exceedingly unfavourable. Montgomery[9] believes that all cases with systemic involvement have a fatal termination in spite of any treatment which may be given. Childrey and New pointed out that the high mortality may be due to the extensive dis-

semination which may have taken place before recognition of the disease. Howes and Morse stated that nine out of every ten patients with systemic blastomycosis die within a year. Stober reported that the duration of illness varied from four months to two and a half years, and that in many cases death was caused by a secondary pyogenic infection.

TREATMENT

Surgical diathermy, radium, roentgen rays and large doses of potassium iodide are used in the treatment of this disease. New[10] gives potassium iodide in doses of ten drops, increased three drops a day until two hundred drops are given three times a day. One should not forget the influence which good food and hygienic surroundings may have upon the treatment of this disease.

The case reported here is of unusual interest on account of the lesion involving the gingival tissue and bone of the lower jaw. It is also of interest from the viewpoint of the geographic distribution of the disease. Blastomycosis is known to exhibit a wide range in incidence, and no doubt causes much confusion in diagnosis. Pulmonary blastomycosis probably is frequently mistaken for tuberculosis.

CASE REPORT

Mr. W. (Case No. 8689), aged 56 years, a storekeeper, came to the Lockwood Clinic on November 25, 1931, for a full mouth dental x-ray. On November 22nd his physician had removed his lower left central incisor because of an apparently infected condition around it.

Examination of his mouth showed a marked hyperplasia of the epithelial tissue in this area, with an ulcer of approximately one centimetre in width on the buccal surface. The ulcer, which was painless, was oval in shape and of a fiery red colour, with a small contracted opening in the centre through which an instrument could be passed into the socket from which the tooth had been removed. The swelling, which was of a soft spongy granulomatous nature, was more prominent on the lingual than on the buccal surface. A very slight amount of thin mucoid pus was exuding from the crater of the ulcer. The submaxillary glands were swollen, hard, and appeared to be adherent to the lingual border of the mandible. The right was the larger of the two glands. The lesion in some ways resembled a low grade epithelioma, but the swelling in the glands was not characteristic of ordinary inflammatory reaction.

Previous history.—On November 19, 1931, the patient had first noticed a slight swelling of his submaxillary glands, and at the same time a swelling of the gum tissue on the lingual surface of the lower left central incisor. This tooth was extremely loose. On November 22nd he saw his physician and he stated that there was also a swelling on the buccal surface. The tooth was removed easily, without any anæsthesia. Upon further questioning Mr. W. stated that this tooth had been sore on two previous occasions, as far back as six months. The lower incisors did not occlude with his upper teeth, and all had been vital when seen two years before. He also stated that about the middle of October he had not been feeling well, and was surprised upon taking his temperature to find it register 102° F. He went to bed for two days and stayed in the house for two weeks, being treated for what resembled an attack of influenza. During this time he checked his temperature and found it to be irregular. In the mornings it was usually normal or subnormal, with a rise to 99° to 100° F. in the afternoons and evenings. He had also had night sweats and a slight cough, with sputum in the mornings. On one occasion, after coughing a little more violently, he had noticed a slight speck of blood in his sputum. He was then advised to have a general examination.

General examination.—A skiagram of his chest (Fig. 1) revealed an extensive infiltration of the left

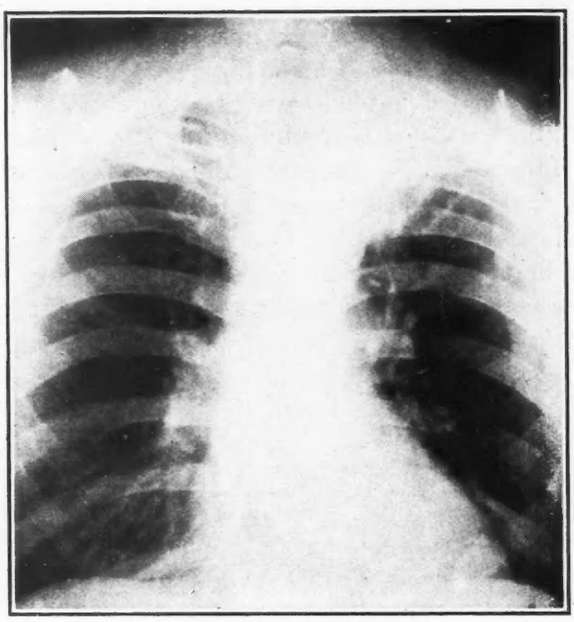

FIG. 1.—X-ray showing extensive infiltration of left apex.

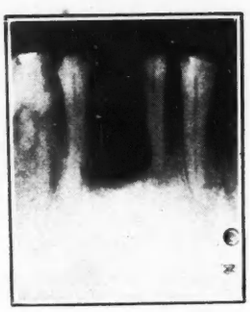

FIG. 2.—X-ray showing extensive loss of bone.

apex which resembled pulmonary tuberculosis. Samples of sputum on two different days were negative for the tubercle bacillus. X-ray showed the right antrum to be cloudy and a small amount of pus was found upon irrigation. The urine was negative. The hæmoglobin was 92 per cent; leucocytes 7,800. Physical examination of the chest did not reveal any serious pulmonary condition. An x-ray revealed entire loss of bone in the area from which the tooth had been removed. The bone supporting the adjacent teeth appeared to be normal.

Progress.—The patient was hospitalized and continuous dry heat was applied to the submaxillary glands. On November 28th the left gland was larger than the opposite one, and two or three tiny elevated yellowish

pinhead nodules were noticed on the gum tissue, about one centimetre from the edge of the lesion. Upon pressure one tiny head of pus was expressed from each one. The following day there was no evidence of them. After five days the glands had decreased somewhat in size, but were still very hard. On December 1, 1931, the ulcer showed little change, so it was decided to remove a small specimen of tissue for diagnosis. The pathological report from the provincial laboratory on this specimen was blastomycosis (Fig. 3.

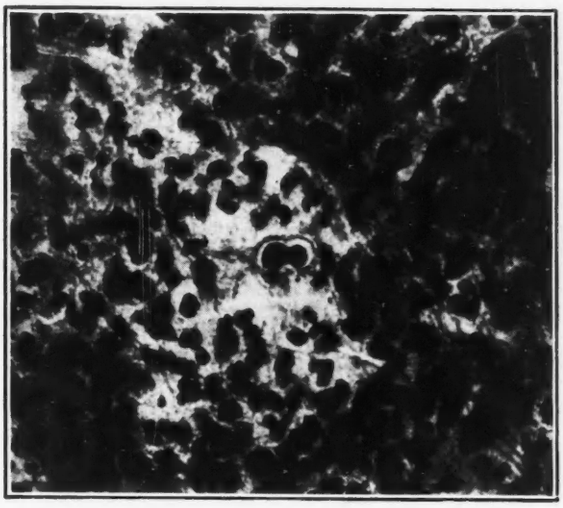

FIG. 3.—Budding form of blastomyces in the centre of the abscess.

On December 4th patient called attention to a number of small globular dull red swellings, about half an inch to an inch in diameter, on his legs. These resembled the tumours seen in erythema nodosum.

The case was referred to Dr. New at the Mayo Clinic, and our diagnosis regarding the gingival lesion was corroborated by Dr. Broders on a biopsy.[11] Physical examination of the chest did not reveal any evidence of tuberculosis, so that it is very difficult to state definitely whether the lesion in the left apex was tuberculosis or blastomycosis. If the chest condition were tuberculous then the gingival lesion is a primary blastomycosis, and it is reasonable to suppose that the organism gained access to the tissue about the time the soreness developed in the gum tissue and the glands became swollen.

Mr. W.'s business has always taken him outdoors a large part of his time, and he states that he has always been in the habit of plucking blades of grass or hay and carrying them in his mouth. He may have carried the organism into his mouth in this manner. On the other hand, if the chest were the primary focus then it is possible that the blastomycetes were present in his saliva at different intervals and that some of these organisms got into the gingival crevice around this tooth and gained access to the tissue *via* this route. Another point of interest is that his previous illness followed the loading of a car of vegetables, at which time he got overheated. His infection may have started at that time.

On account of not being able to prove definitely that the chest lesion was blastomycosis Dr. New advised destruction of the jaw lesion, with surgical diathermy, to be followed by radiation extending over the glands of the neck. This treatment was carried out, but it will be necessary for some time to elapse before any opinion regarding the benefit of the treatment may be given.

SUMMARY

1. A case of blastomycosis is reported in which it is difficult to determine the site of the primary lesion.

2. Blastomycosis involving the gum tissue and jaw is extremely rare. It is my opinion that there probably have been other such cases which have either not been reported or not recognized.

3. This paper shows the benefit to be derived by cooperation between the medical and dental practitioners; also the value of a complete general examination.

4. It serves to show that the dental surgeon who is well trained in recognizing pathological conditions in the oral cavity is a valuable asset to a group practising medicine.

5. One should remember that the dentist often has the opportunity of seeing very early oral lesions of systemic disease before the physician. It therefore behooves every member of the dental profession to be familiar with these lesions.

6. This case proves that it may be difficult to differentiate between pulmonary blastomycosis and tuberculosis.

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THE CURATIVE EFFECTS OF CEREALS AND BISCUITS ON EXPERIMENTAL ANÆMIAS*

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UP to 1928 it was supposed that the administration of iron alone could cure secondary anæmia. At that time Waddell, Elvehjem and Hart published their work on the ineffectiveness of purified iron in the cure of secondary anæmia.[1, 2] These publications were soon followed by the reports of an increased hæmoglobin regeneration when small amounts of copper were given in addition to purified iron.[3, 4, 5] Since then others have confirmed this specific property of copper,[6, 7] and although other elements have been tested in combination with iron none have been found to have any anti-anæmic properties,[8] except possibly manganese. However, to date there has been no definite agreement in regard to the action of this element.[9, 10]

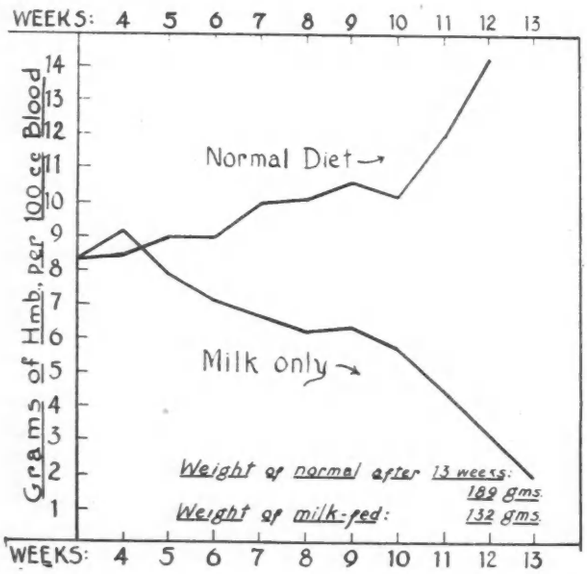

CHART 1.—Changes occurring in the hæmoglobin content of rats when fed normal diet and an exclusive milk diet.

It has been found experimentally that certain foodstuffs have a special curative value in dogs suffering from a secondary anæmia.[11, 12] Of these liver is the most potent, while apricots, peaches, prunes, skeletal muscle and some leafy vegetables are moderately so. In view of these facts, we decided to investigate the anti-anæmic value of different cereals and biscuits, especially those that constitute the first solid food of infants. These cereals and biscuits provide from 20 to 40 per cent of the calories of the growing child's diet.

At birth the normal hæmoglobin of the rat is between 13 to 15 grams of hæmoglobin per 100 c.c. of blood, but from then until weaning at 3 weeks of age, when solid food is introduced into the diet, there is a gradual reduction in the hæmoglobin to about 8 grams per 100 c.c. of blood. A reduction also occurs in the human subject during early infancy. A secondary anæmia of the nutritional type can be produced experimentally in rats by withholding solid food at the time of weaning and feeding milk only.[13] After being on this milk diet for about 8 weeks' time the rat's hæmoglobin will be found to fall as low as 3 to 5 grams of hæmoglobin per 100 c.c. of blood (Chart 1). This is due to the low iron and copper content of the milk. It is of interest that as the hæmoglobin falls, the total iron and copper content of the rat remains stationary (Chart 2). By 12 weeks of age the hæmoglobin

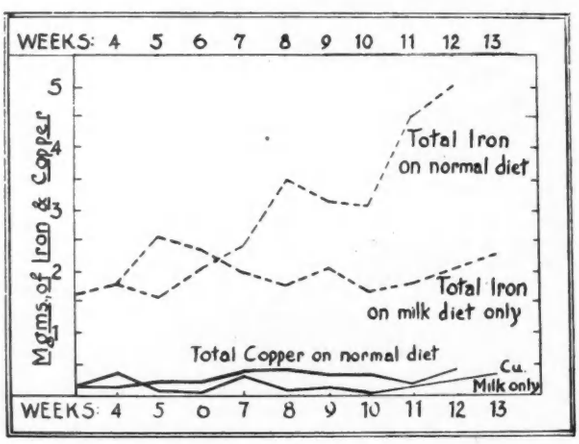

CHART 2.—The difference in the total iron and copper content of the whole rat when fed milk only and a normal diet.

* From the Nutritional Research Laboratories of the Sub-Department of Pædiatrics, University of Toronto, and the Hospital for Sick Children, Toronto. Read before the Canadian Society for the Study of Diseases of Children at its Ninth Annual Meeting at Lucerne-in-Quebec, June 5, 1931.

content of the blood of rats put on a normal diet at time of weaning returns to the level found at birth (Chart 1), and at the same time the total iron content of the rat increases proportionately, although the copper remains stationary (Chart 2). The normal diet contains 15 times more iron and 13 times more copper than the milk diet.

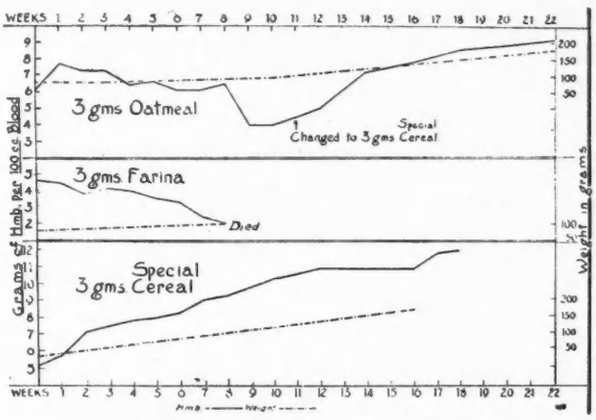

CHART 3.—The effect of 3 grm. of various cereals on the anæmia in rats.

When the hæmoglobin of the rats on the experimental milk diet had fallen to 4 to 6 grm per 100 c.c. of blood, known quantities of different foods were added to the diet. These foods were cereals consisting of farina, oatmeal and a special cereal[14] containing alfalfa, corn meal, wheat meal, oat meal, yeast, wheat germ and bone meal. Also biscuits such as zwieback, whole wheat, arrowroot and a special biscuit[15] containing 15 per cent of wheat germ and bone meal were tested. In Chart 3 is seen the hæmoglobin response in anæmic rats to daily intake of 3 grm. portions of oatmeal, farina and the

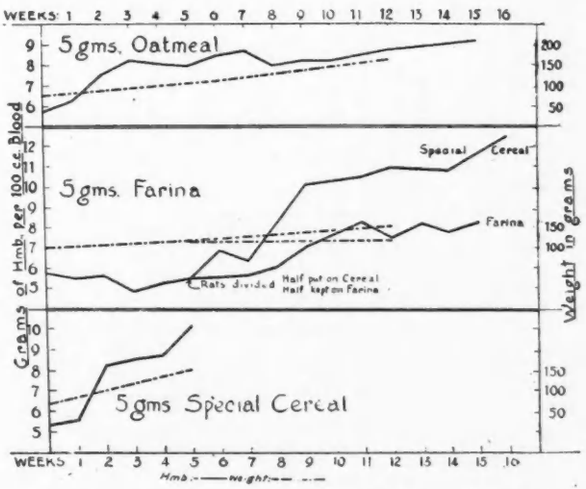

CHART 5.—The effect of 3 grm. of various biscuits on the anæmia in rats.

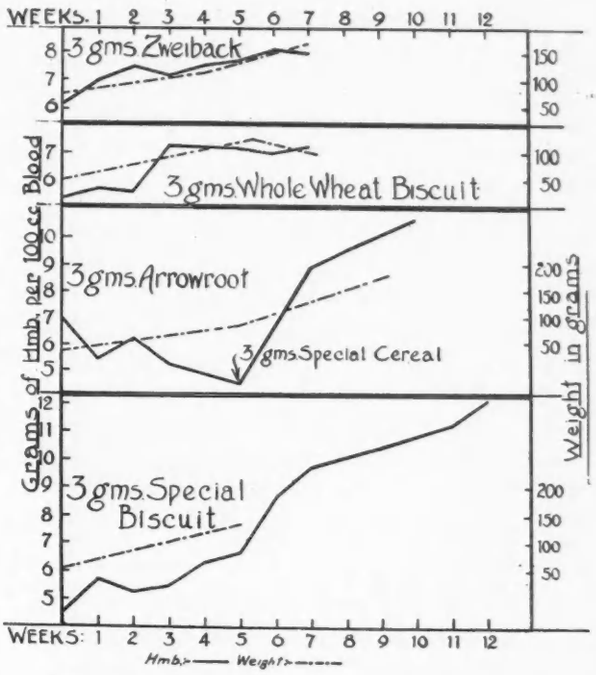

CHART 4.—The effect of 5 grm. of various cereals on the anæmia in rats.

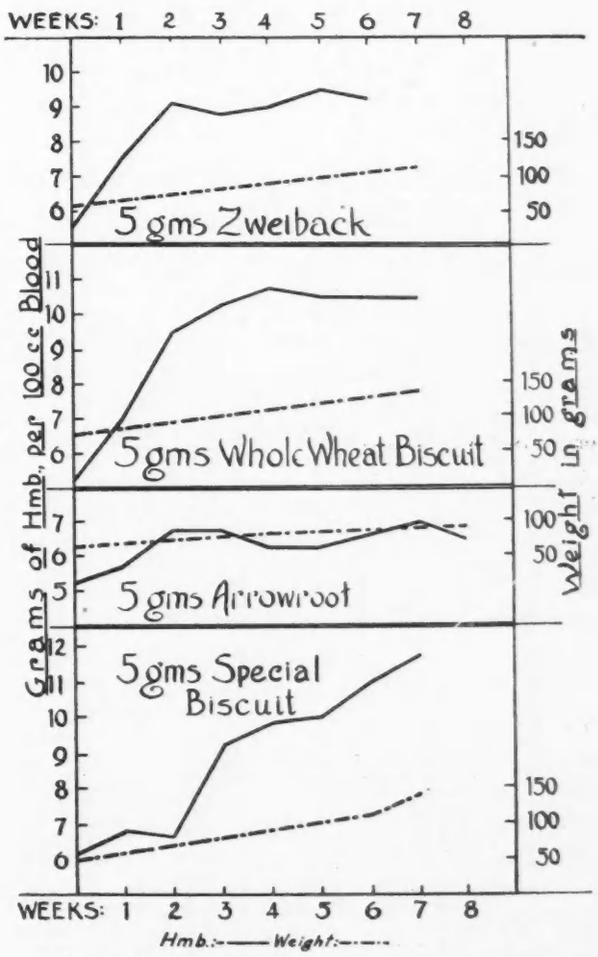

CHART 6.—The effect of 5 grm. of various biscuits on the anæmia in rats.

special cereal, with milk *ad lib.* As the rat's daily intake of food is between 7 to 10 grm., the above will represent between 33 to 50 per cent of the total calories. Three grm. of oat meal and farina have no curative value, but on 3 grm. of the special cereal there was a production of 6.9 grm. of hæmoglobin per 100 c.c. of blood in 18 weeks' time. The curative value of the special cereal is also shown in Chart 4, when rats which were on 3 grm. of arrowroot biscuits were changed to 3 grm. of the special cereal.

On 5 grm. portions of the same cereals, which represents between 50 to 70 per cent of the total calories, there was found an immediate hæmoglobin response in the special cereal, and although there was a response in hæmoglobin formation to farina and oatmeal it was not marked (Chart 4). There is also seen the effect of the special cereal on hæmoglobin regeneration when one-half of the rats which were on farina for 5 weeks were changed to special cereal. There was also a curative response when rats on 3 grm. of oat meal were changed at the end of 11 weeks to 3 grm. of special cereal (Chart 3). The different hæmoglobin responses to the daily consumption of 3 grm. and 5 grm. portions each of various biscuits for rats are seen in Charts 5 and 6. In Chart 5 it will be seen that only the special biscuit had any marked effect. On 5 grm. amounts of biscuits the hæmoglobin regeneration was better, although arrowroot had no curative effect.

Thus it has been found, when anæmic rats are fed 3 grm. of different cereals and biscuits daily, that on the special cereal and the special biscuit there is a curative effect. This amount of food represents 33 to 50 per cent of the rat's total daily intake, and if necessary the equivalent could be contained in the growing child's diet. On the other hand, we do find a curative effect when 5 grm. of whole wheat are given, but this would mean that about 70 per cent of the diet would consist of one type of food, which a child is unlikely to take willingly. It was also noted that rats fed on the special cereal and biscuit made a greater gain in weight than those fed on the other cereals and biscuits.

Previously it has been mentioned that to cure anæmia the combination of iron and copper is needed. To determine if such a relationship existed between the hæmoglobin response of anæmic rats and the iron and copper content of the food consumed, the different foods were dry ashed and analyzed for their iron and copper content. In Table I is seen the iron and copper content expressed in mgrm. per 100 grm. of food. In the last two columns is the increase of hæmoglobin in anæmic rats which have consumed 3 grm. and 5 grm. portions of the various foods daily. Those on the 5 grm. portions consume approximately 100 grm. of food in 3 weeks, and those on the 3 grm. portions consume approximately 100 grm. in 5 weeks. Thus it can be seen that the production of hæmoglobin varied directly with the iron and copper content of the food. Zwieback is more effective in building up hæmoglobin than oatmeal, although oatmeal has a higher iron content. In all probability the higher copper content of the zwieback is the influencing factor. Manganese determinations were not made.

CLINICAL MATERIAL

Recently the influence of different cereals on the weight of two groups of children was investigated[14] One group of children was given in the diet ordinary cereals, such as farina, wheatena or oatmeal, while the second group received the same quantity of the special cereal. The groups were kept on the diet for 10 weeks, and at the end of this time the diets were reversed for the next 10 weeks. The daily intake

TABLE I

Food	*Ash percentage*	*Mg. of Fe. in 100 grm. of food*	*Mg. of Cu. in 100 grm. of food*	*Increase in Hgb. during 3 weeks on 5 grm. of food*	*Increase in Hgb. during 5 weeks on 3 grm. of food*
Special biscuit	3.85	0.400	0.072	+3.1	+2.0
Special cereal	2.92	2.400	0.130	+3.4	+2.7
Oatmeal	1.69	0.380	0.004	+2.5	+0.5
Zwieback	0.73	0.220	0.034	+3.0	+1.5
Arrowroot	0.67	0.170	0.008	+1.6	−2.5
Farina	0.39	0.080	0.004	−0.8	−2.0
Milk	0.70	0.024	0.001	−1.4	−3.2

Table I represents the increase that occurred in hæmoglobin when approximately 100 grm. of food were consumed in 3 weeks and in 5 weeks, and also shows the influence of iron and copper on the hæmoglobin content.

of cereal was four ounces. In the case of the special cereal this supplied 27.2 mgrm. of iron daily, while the ordinary cereals supplied only 1.2 mgrm. daily. The children on the special cereal made an average gain of 1.2 grm. of hæmoglobin per 100 c.c. of blood, while those on the ordinary cereal made no gain at all.

CONCLUSIONS

1. Rats when placed on an exclusive milk diet after weaning developed a secondary anæmia of the nutritional type in 5 to 8 weeks' time. In these rats the hæmoglobin is reduced to 4 to 6 grm. per 100 c.c. of blood, instead of the normal value at this age of 13 to 15 grm.

2. This anæmia could be cured when 33 to 50 per cent of the total diet consisted of a special cereal or a special biscuit in which there was a relatively high proportion of copper and iron. Other foods tested were farina, oatmeal, zwieback, arrowroot and whole wheat biscuits. These did not cure anæmia when fed in the same proportions.

3. Clinically, when a group of normal children were fed the special cereal there was an increase in hæmoglobin, whereas on ordinary cereal there was no increase.

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THE BLOOD IN PREGNANCY*

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THE anæmias that may be encountered during pregnancy fall into the following simple classification:

A. *Co-existing with, but unrelated to, pregnancy.*
   1. Primary anæmias — pernicious anæmia, chronic chlorosis, Banti's disease, leukæmia, etc.
   2. Secondary anæmias due to pre-existing chronic disease, *e.g.*, chronic sepsis, chronic nephritis, etc.

B. *Anæmias due to complications of pregnancy, e.g.*, pyelo-nephritis, sepsis, bleeding, toxæmia of pregnancy.

C. *Anæmias directly due to pregnancy.*
   1. Pernicious anæmia of pregnancy.
   2. Physiological anæmia of pregnancy.

We propose to discuss only the so-called physiological anæmia of pregnancy.

It seems to us of vital importance to know how much anæmia in pregnancy is actually physiological. The literature is full of contradictions in the matter. Many writers take a very serious view of any tendency to anæmia in pregnancy, while others think it should be ignored. As in many other clinical matters, the point at which the physiological ceases and the pathological begins is hard to determine precisely. Most commonly we tend to err by seeing too much of the pathological, and we often do not make sufficient allowance for natural variations. This we believe to be true in the anæmia of pregnancy.

In order to learn all we could about this anæmia, we have, during the past two years, studied the blood of all the pregnant women who presented themselves at the prenatal clinic in St. Boniface Hospital. We have seen over 200 cases in all. For the purpose of this study only quite normal cases were selected. A thorough physical examination was done and cases were eliminated in which there was any other condition that could in any way affect

* Read at the annual meeting of the Manitoba Medical Association, Brandon, September 8, 1931.

the blood. After this process of elimination, 116 normal cases remained. The blood was examined as often as possible. In some cases frequent counts throughout several months were made, but in others only one count before and one after delivery was possible. The hæmoglobin was estimated by the Sahli method and the red blood cells were counted in the ordinary way. No treatment of any sort was given. Each patient was also examined at intervals in the obstetrical department, and they were all ultimately delivered in the hospital under the staff obstetricians. They were followed in the ward and records of various circumstances in connection with their delivery were kept.

We have formed some opinion regarding the normal variations in the blood during uncomplicated pregnancy in healthy women. We wish to present our findings and opinions.

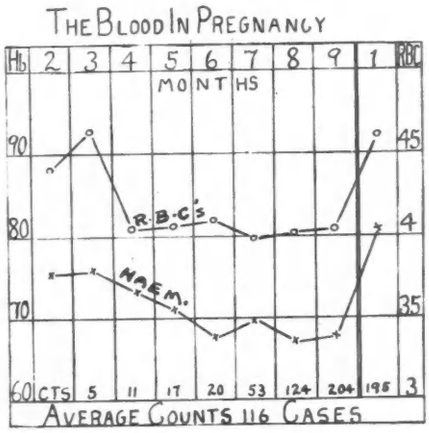

CHART 1

Chart 1 is a composite graph showing the variation in the hæmoglobin level and erythocyte count from the second month of pregnancy to the first post partum month. This includes all the blood counts that were made (729). The figures below show the number of counts in each month. These counts were averaged to arrive at the figure used in the graph. Except in the first two months, we believe there is enough material here from which to deduce correct conclusions. This graph supplies the following facts:

1. During the second trimester there is a gradual drop in hæmoglobin from about 76 to 68 per cent. The erythrocytes remain slightly low.

2. During the third trimester there is a continuous low hæmoglobin content, averaging about 67 per cent, the cells remaining about four million.

3. In the first half of the first post-partum month, the blood recovers to normal figures (80 per cent hæmoglobin and 4.6 million erythrocytes).

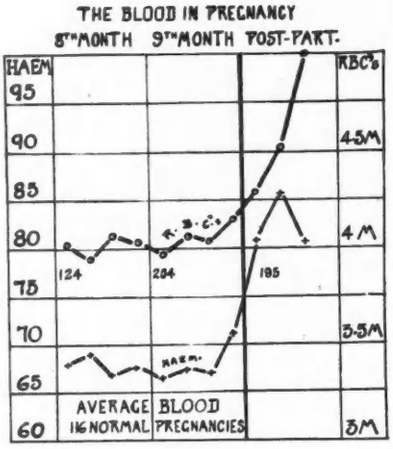

CHART 2

Chart 2 shows the average weekly blood counts during the last two months and the first post-partum month. This shows that the recovery of the blood commences in the first week before delivery and reaches its height in the second week after delivery. Then there is a slight reduction. This brings the blood back to the usual level.

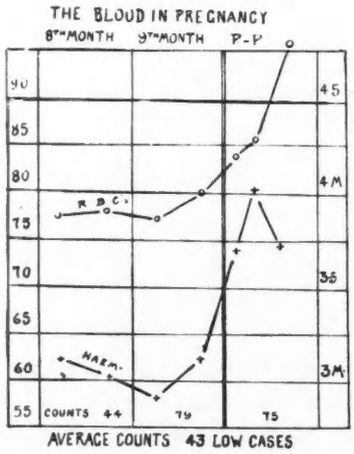

CHART 3

Chart 3 shows the average count in the 43 lowest cases in the series. It is no different from Chart 2, except that it shows a more profound anæmia. There was, of course, a wide variation in individual cases. Practically every case showed some degree of anæmia.

TABLE I

Hæmoglobin Level Percentage	*Percentage of Cases*
80 plus	2
70–79	28
60–69	50
50-59	20

Only 2 maintained a hæmoglobin of 80 per cent or more throughout; 28 per cent did not go below 70 per cent hæmoglobin; 50 per cent descended into the sixties and 20 per cent reached hæmoglobin levels below 60 per cent. None were below 50 per cent. We can say that practically every case at some time during pregnancy showed some degree of anæmia, as judged by a simple blood count.

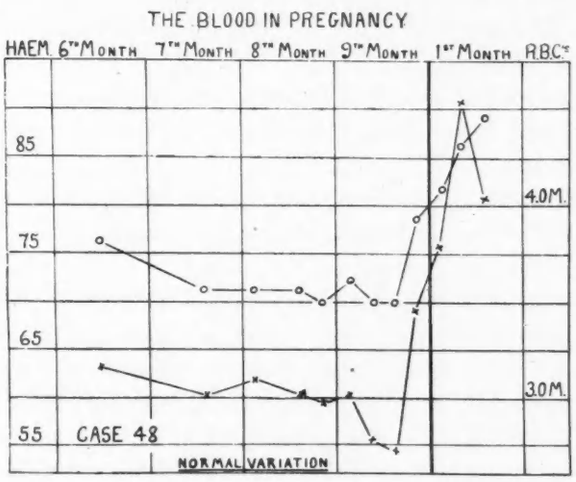

CHART 4

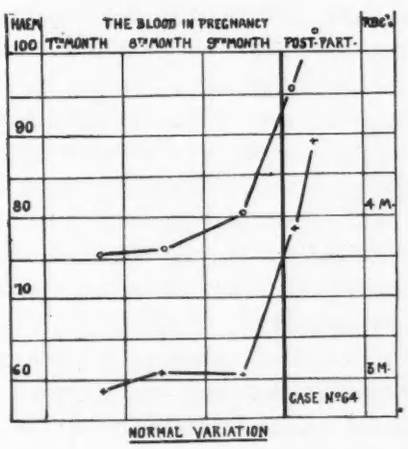

CHART 5

Charts 4 and 5 show the course in some individual cases. The features to be noted are:— the very definite degree of anæmia that may develop; the tremendous increase in blood values that take place in the last few days of pregnancy and the first week after confinement; the most important feature is that recovery begins definitely before labour commences.

These charts will give an idea of the frequency and the degree of anæmia in pregnant women. What should be our attitude towards this condition? To what degree is it physiological and innocuous, and should it ever be treated seriously? In order to decide whether or not it is ever harmful, we divided the 116 cases into three fairly equal groups according to the severity of the anæmia. We have compared the course of the most anæmic with that of the least anæmic of these three groups, with the idea of determining whether or not the existence of the anæmia caused any sort of abnormality, and whether it is a detriment to the mother or the child. The results of this comparison are shown in Table II.

This table shows: —

1. The average labour time in the low group (6.4) is shorter than that of the high group (8.3). It is therefore just to infer that a low blood does not contribute to prolonged labour.

2. It is frequently said that pale anæmic looking women are more subject to post-partum hæmorrhage. Our figures suggest that the reverse is true. Abnormal bleeding took place in 4.6 per cent of the low group and 11 per cent of the high group.

3. Lacerations were slightly more common in the low group (31 to 28 per cent).

4. Forceps were used more commonly in the low group (18 to 11 per cent).

5. The weights of the children from the more anæmic mothers were slightly better than those from the less anæmic.

6. None of these patients had any serious symptoms. Minor complaints, such as headache, dizziness, backache, etc., were more common in the low group (49 to 37 per cent).

TABLE II

Hæm.	*No.*	*Labour Time*	*Abnormal Bleeding*	*Laceration*	*Forceps*	*Sex*	*Weight*	*Symptoms*
50–63	43		2 cases	12 cases	8 cases	F.25		21 cases
		6.4 hrs.	4 6%	28%	18%	M.18	7.5 lbs.	49%
70–80	37		4 cases	11 cases	4 cases	F.17		13 cases
		8.3 hrs.	11%	31%	11%	M.18	7.3 lbs.	37%

There is really no very significant difference in the two sets of figures. Considering the definite difference in the blood conditions of the two groups, this might seem surprising. It means that pregnant women who develop a moderate anæmia have just as good children and have them as easily as those with blood that has remained near the normal level. Indeed, the figures suggest that the lower blood group do a little better than the higher group.

From these criteria, then, we would say that a moderate anæmia appears not to have any abnormal results in pregnancy.

There are other considerations which make one feel that this anæmia is not a disease. These women do not look anæmic. Even those whose hæmoglobin descends to 50 per cent appear to be quite healthy. Some of them, indeed, appear more plethoric than anæmic. The blood smear shows no abnormality. There is no evidence of a pathological destruction of red blood cells and nothing to suggest abnormal regeneration. The great rise in blood values that occurs just before and after confinement cannot, therefore, be due to new blood formation. If it were actually due to regeneration there would be nucleated red cells, reticulocytes, polychromatophilia, etc. The spleen is never palpable as is the case in most true anæmias. None of the symptoms that one usually encounters in real anæmias of a like degree were noticeable here. Such symptoms are dyspnœa, vertigo, weakness and palpitation. Many of these women with low blood counts were doing the usual work incident to the care of large families without complaints or distress of any sort.

For these reasons we believe that this is not a true anæmia and not a pathological condition. How, then, can we account for it? We think there are two elements in the explanation. The most important is dilution of the cellular element by increase of plasma. This would account for a reduction in the number of the red cells and the percentage of hæmoglobin. It is obvious, however, that the hæmoglobin is reduced to greater degree than the cells. This is accompanied naturally by a reduction in the colour-index. This simply means that during pregnancy each red cell has less hæmoglobin in it than in normal circumstances. For some reason or other, the bone-marrow during pregnancy produces cells with about 70 per cent of the normal load of hæmoglobin. The dilution idea is not new. Even the ancient writers refer to the plethora of pregnancy and most clinical observers have come to the conclusion that pregnant women have an hydræmia. This inference follows on simple clinical observation. Pregnant women appear full blooded. Their veins are full; their tissues seem full of fluid; their limbs are rounded out; and when they are wounded blood flows quite readily. After delivery, they seem to shrink in all dimensions. The face and limbs become visibly less rotund.

The idea of dilution gets support from purely theoretical consideration. Roughly speaking, it is the plasma of the blood which is responsible for the building of human tissues (katabolism) and it is the erythrocytes and hæmoglobin which carry oxygen and are mainly responsible for combustion (anabolism). During pregnancy the main physiological function of the mother is to build new tissue. She therefore requires more plasma. When the fetus has attained its full growth in the ninth month, this extra plasma is no longer necessary, and it disappears.

The final proof of the existence of increased plasma is given by blood volume estimations and hæmatocrit readings. Our first introduction to the subject of blood volume estimations was gained from a paper by Keith, Rowntree and Gerrahaty, published in 1915.[1] In the course of investigating blood volumes on many types of cases, they observed a post-partum decrease in total blood volume of approximately 1000 c.c. They considered that only about 300 c.c. of this could be accounted for in actual blood lost at the time of delivery. This observation appeared to us to explain, on the basis of a dilution, the low hæmoglobin before delivery and the relatively high estimations observed after delivery. It was, therefore, for the sake of determining more accurately the relationship between the blood counts and the blood volume that we decided to do volume estimations. The technique used was that described by Rowntree, Brown and Roth.[2] Estimations were made appromimately three weeks before delivery and on the tenth post-partum day, a total of eight cases being completed. Hæmoglobin estimations and erythrocyte counts were taken at the time of each blood volume estimation.

As far as we were able to ascertain, no case studied showed any deviation from what might

be expected in a normal pregnancy, and in each case a striking variation was observed in the plasma and total blood volumes before and after delivery.

Chart 6 is a graphic representation of the total blood volumes and the relative volumes of cells and plasma before and after delivery. Three typical cases are represented. The

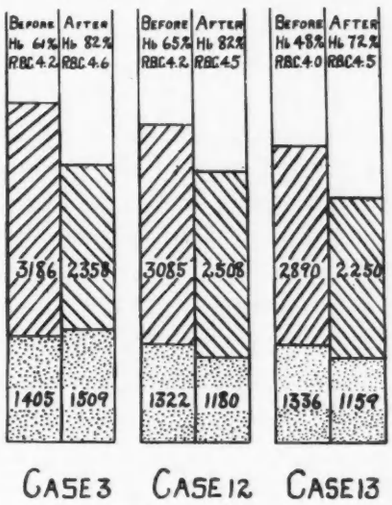

CHART 6

shaded diagonal lines represent the plasma and the dots represent the cells. The figures indicate the volume of each in c.c.'s. The blood counts taken at the same time are marked above. In each case the marked post-partum decrease in total volume and plasma is at once apparent, paralleling an increase in the hæmoglobin percentage. We believe that these results show this anæmia to be only relative and due to a physiological increase in blood plasma before delivery.

There are some practical facts to be derived from these observations: (1) A moderate anæmia—with hæmoglobin going as low as 50 percent—is common in normal pregnancy. (2) This anæmia does no apparent harm to the mother or child. (3) It clears up entirely during the first two post-partum weeks. (4) Being physiological, it does not require treatment. It is conceivable that treatment might actually do harm. In some quarters these patients are plied with liver, iron and copper. We feel that this is quite unnecessary, and should not be practised.

Let us not leave the impression that all the anæmias of pregnancy are to be studiously ignored. Any condition that produces anæmia in normal women may also do so during pregnancy. The pernicious type must always be kept in mind. Fortunately, it is very rare; in this country not more than one case develops in every thousand pregnancies. So far as we have been able to make out, it has no relationship to the physiological anæmia. It must be suspected if urgent symptoms of anæmia develop or if the hæmoglobin goes much below 50 per cent. The blood picture is identical with that of pernicious anæmia. It is frequently fatal unless diagnosed and treated energetically with liver and transfusions. There is no reason for confusing it with physiological anæmia, because it produces sudden and desperate illness which physiological anæmia never does. Because it is often associated with œdema and albuminuria, it has been mistaken for the ordinary toxæmia of pregnancy. This confusion will not arise if the blood pressure is taken or a blood examination is done.

There are some other anæmias that might be confused with the physiological anæmia of pregnancy. The most common of these is

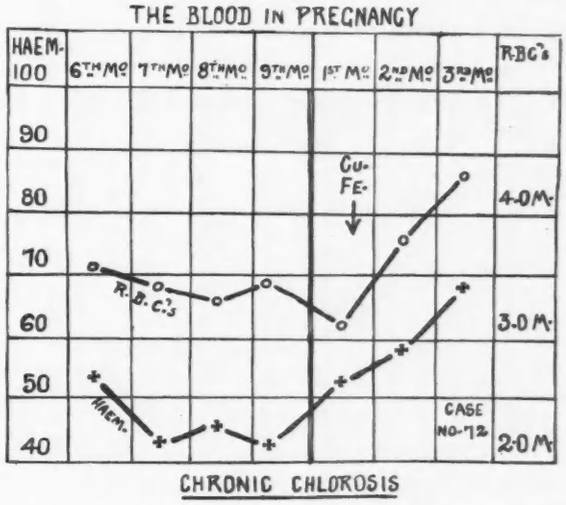

CHART 7

chronic chlorosis. This cannot be differentiated during pregnancy unless the patient gives a definite history of antecedent anæmia or shows some of the physical evidences that often mark chronic chlorosis, *i.e.*, the smooth tongue, palpable spleen, achlorhydria, and characteristic finger nails.[4] After delivery, if the blood does not immediately return to normal, this or some other anæmia must be suspected.

Chart 7 shows a case which, during pregnancy, appeared to have the ordinary physio-

logical anæmia, though more profound than usual. In the first post-partum month, however, the blood did not recover. We therefore felt sure that there was some other cause. We decided that it was chronic chlorosis. The graph shows that the patient recovered almost completely on iron and copper.

It is most interesting to speculate upon the relationship of the simple anæmia of pregnancy to chronic chlorosis. By chronic chlorosis we mean that anæmia of chlorotic type which is so common in middle-aged women, for which no adequate cause can be found and which does not fit in with any of the known primary anæmias. It is also called "idiopathic achlorhydric anæmia" and "chronic idiopathic hypochromic anæmia." It is usually very chronic, fairly resistant to treatment, and only partially disabling. We believe that many such cases simply represent a perpetuation of these physiological anæmias of pregnancy. The arguments in favour of such a relationship are that the blood in chronic chlorosis is similar to that of the blood in pregnancy, *i.e.*, it shows a low colour-index anæmia of moderate degree; and many chlorotic women definitely date their anæmia from pregnancy. We have actually seen a previously healthy woman persist in her pregnancy anæmia after delivery. Her hæmopoietic system appeared to lack the qualities necessary to make the readjustment, and the blood remained as it was during the last three months of pregnancy. We intend to make an effort to throw more light on the relationship of these two conditions by blood volume estimations.

This tendency to initiate chronic chlorosis appears to be the only pathological feature in the simple anæmia of pregnancy. The possible origin of some cases of chronic chlorosis is analogous to the theory advanced by Lloyd Jones[3] in connection with the pathogenesis of ordinary chlorosis in girlhood. According to this theory, simple chlorosis is a prolongation and accentuation of a physiological anæmia of puberty. This theory is referred to more fully in our recent article on chronic chlorosis.[4]

This investigation was materially assisted by a grant from the Trustees of the Banting Research Foundation to whom our thanks are due. We also wish to thank the Grey Nuns of St. Boniface Hospital for their cooperation in providing materials, technicians and space.

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SYMPATHECTOMY IN A CASE OF RETINITIS PIGMENTOSA*

BY GLEN CAMPBELL, M.D.,

Vancouver

WHEN Dr. N. D. Royle,[1] of Australia, announced his operation of sympathetic ramisection for retinitis pigmentosa at the Winnipeg meeting of the British Medical Association, in 1930, it appealed to me at once as promising excellent results. He reported 5 cases that he had operated on for retinitis pigmentosa, all of which showed improvement in the acuity and fields of vision, and the operation he performed was thoracic sympathetic trunk section just about the level of the second thoracic ganglion.

CASE REPORT

The case that I wish to report is that of a young lady, twenty-four years of age, who came to see me on October 7, 1930. She gave a history that trouble with the eyes was first noticed at sixteen years of age. She could not see things quickly, could see things better at a distance than close, and her vision became blurred after reading a short time. Her vision was good in looking straight ahead, but she could not see well on all sides. She had great difficulty in finding her way about at night; this was first noticed about six years previously and the condition became gradually worse. No difference in the vision of the two sides was noticed. When a child this girl could distinguish all colours. She never had any trouble in painting at school and was able to do embroidery work in colours up to six years before. About this time she became conscious of some difficulty with her colours, the bright yellows, bright pinks and some shades of green and blue.

The history did not reveal any similar condition in the family, but her mother had married her first cousin on her mother's side. Her father died at 55 following an attack of influenza. She has two sisters and one brother. I examined the two sisters and there was no evidence of a similar trouble. Her brother is said to have no trouble with the eyes.

Her family doctor, Dr. C. E. Brown[2], reported as

* Read at the twentieth annual meeting of the North Pacific Surgical Association, Vancouver, B.C., December 4, 1931.

follows. The blood Wassermann and Kahn tests were negative. Hæmoglobin 85 per cent; blood pressure 120/80. Urine: acid in reaction; negative for sugar; a few white blood cells and epithelial cells. Gastric analysis showed a low amount of HCl. Her basal metabolic rate was +3. Dr. W. A. Whitelaw[3] reported his x-ray findings as follows. "The sella turcica is normal in all respects." Dr. C. S. McKee[4] reported the blood sugar curve to be within normal limits.

Her knee jerks were present and equal. Hearing was quite normal and mentality very good.

Findings.—R.V. = 6/12 J. 3. L.V. = 6/12 J. 3. Muscle balance good.

Tension was equal and within normal limits. The retinal vessels were very small. Pigment deposits resembling bone corpuscles or spiders were scattered over the fundus, but were comparatively few in number. The pupils were equal in size, being 6 mm. in diameter, and react to light stimulation, in convergence, and consensually. The fields for white, blue, red and green were reduced to about 3° in all directions on each side around the fixation point.

I suggested the operation on the sympathetic as advised by Royle. On November 20, 1930, Dr. R. E. McKechnie did a superior cervical ganglionectomy on the left side. Recovery was uneventful. Early in December a photograph was taken which demonstrated the result in so far as the action on the sympathetic was concerned. This showed the left pupil to be contracted to 3 mm., while the right was 6 mm. (paralysis of the sympathetic to the radiating fibres of the iris, left side); an enophthalmos of 4 mm.;* a pseudo-ptosis (paralysis of the sympathetic to the superior palpebral involuntary muscle, with one set of fibres forming attachment of the levator palpebræ superioris to the upper margin of the tarsal plate).

On March 30, 1931, a change in the white fields only was noticed on the left side, with a small sector in the temporal area of the right side. On April 14, 1931, the white fields still showed a greater improvement on both sides, with a sector of green only appearing on each side. On June 1, 1931, still further improvement in white and green fields was noted on each side, to almost 180° in the upper arc. Up to December 4, 1931, no improvement for red and blue on either side appeared with a disc of 5 mm. (See figures).

Her macular vision was the same on the day of reporting as before the operation. Her tension has varied between 12 and 14 mm. of Hg. (Schiotz) on each side since the operation, and still remains the same. The fields have been practically the same for the past two or three months.

In regard to the pathology of this disease, E. Treacher Collins[5] says, "the evidence afforded by pathological investigations seems conclusively to show that retinitis pigmentosa may arise and exist for many years unaccompanied by any thickening of the choroid vessels. Further, that this disease starts in the retinal neuroepithelium, which having attained its full normal development then degenerates. As it is an hereditary condition this tendency to degenerate must be due to some inherent weakness in the affected cells.

"Following on the atrophy of the rods and cones there is atrophy of the ganglion cells and other nervous elements in the retina, together with a dwindling of the smaller blood vessels of both the retinal and choroidal circulations. The reason that the pigment patches in retinitis

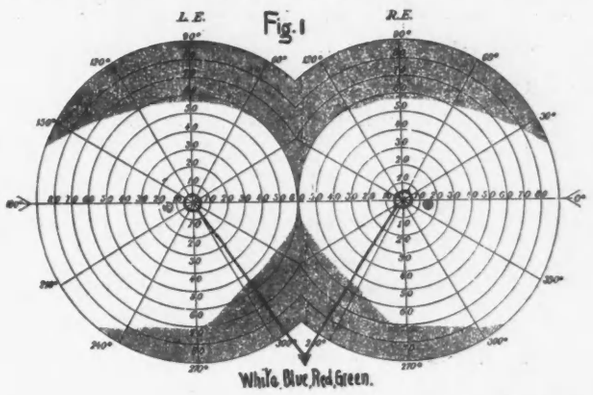

FIG. 1.—October 18, 1930. Fields taken before operation. Fields for white, blue, red and green were reduced to about 3° around the fixation point.

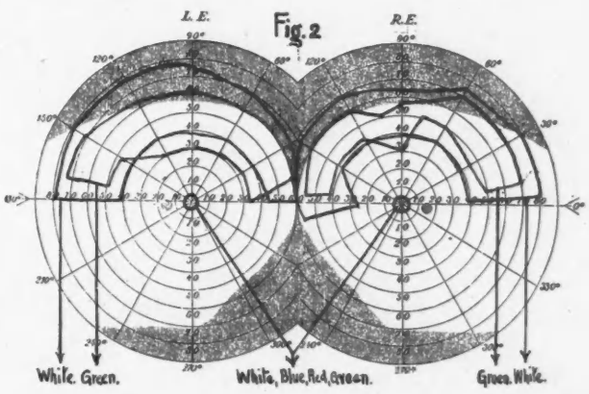

FIG. 2.—September 20, 1931. Fields taken ten months after the first operation (left side).

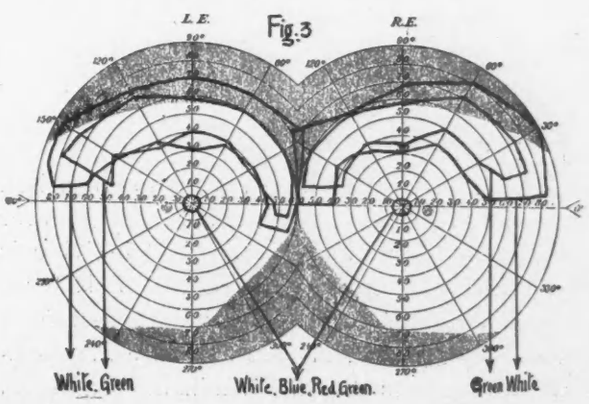

FIG. 3.—Nov. 20, 1931. Fields taken twelve months after the first operation (left side) and 24 days after the second operation (right side).

* Prof. Whitnall[14] believes that "this is not due to paralysis of the orbitalis muscle of Muller. He cannot believe that this narrow vestige has any such effect either (a) by relaxation of the periorbita in the inferior orbital fissure, or (b) by removal of any effects its 'normal tonus' might have on the venules which traverse it from the widely anastomosed ophthalmic system to the pterygoid plexus. The enophthalmos, he considers, is more likely due to relaxation of the whole ophthalmic system of vessels by removal of the sympathetic tone."

pigmentosa assume a bone-corpuscle shape is due to the pigment epithelial cells making their way into the lymph sheaths around the retinal blood vessels."

For an interesting and instructive study of the pathology of a case of retinitis pigmentosa I refer you to the report of a case by F. H. Verhoeff,[6] of Boston, Verhoeff remarks that "few eyes affected with retinitis pigmentosa have been examined microscopically." His case was a man of 64 who had been blind in both eyes for twenty years.

In regard to the etiology of the disease, Nettleship found heredity without consanguinity in 23 per cent of the cases. Consanguinity without heredity is found in 23 per cent of the cases also, and heredity with consanguinity in 3 to 4 per cent (Parsons[7]). Believing that this story would not be complete without some consideration of the subject of heredity and consanguinity as it plays so important a part on the subject under review, I have endeavoured to secure the latest information.

It is well established now, I believe, that the chromosomes play an important part in carrying hereditary factors. The nature of the chromosomes depends upon the number and quality of their composing genes. Stockard,[8] says: "the germinal constitution has a long path to follow in evolving the mature individual. It is questionable whether development ever does produce a full expression of the actual hereditary background. In other words, the development of a person depends, on the one hand, on the exact nature of the original germinal composition, and, on the other hand, upon the varying elements which the environment may present, and the environment is continuous from the germinal beginning to the end of life and it is mutual: each modifies and affects the other.

"The inheritance or genetic basis may be defined as the complete complex of factors which the individual receives through the union of the egg and spermatozoon from which it arises. Certainly no other factors except these can ever be present in this individual. Most individuals must carry, therefore, a hereditary basis for a large number of characters quite different from those they express: in part these are the recessive antagonists to the dominant characters which do develop."

Van Duyse[9] says, "The influence of consanguinity is not deleterious *ipso facto*. It is nil in the case of families without stigmas and of restricted influence in the case of pathological characters which are dominant. Its importance is noted, however, in recessive characteristics in which case the pathological manifestations are noted often in the children of blood relations. When they appear for the first time one must assume that they have previously existed in the ascendants and are able to remain latent for several generations. Familial diseases act like recessive characteristics." Van Duyse says that retinitis pigmentosa is transmitted as a recessive.

N. A. Pletneva[10] believes that retinitis pigmentosa may be a manifestation of dysfunction of the pituitary gland because it is often associated with various degenerative processes, such as deafness, muteness, idiocy, harelip and dystrophia adiposa genitalis. She found that among 65 patients with typical retinitis pigmentosa 43 patients showed changes in the sella turcica by x-ray examination. These were approximation of the clinoid process of the sella with narrowing of the entrance to it. In some cases there were atrophic and degenerative changes of the processes and the back of the sella, and calcification of the bone of the sella turcica.

In the case reported here there was no visible disturbance in the development of her extremities; her hearing was quite normal on each side; her mentality was very good; and the x-ray examination of the sella turcica was normal in all respects.

In the past the prognosis in retinitis pigmentosa has been very bad. The fields of vision gradually became smaller until they are reduced to a small area around the macula. The macular vision was retained until very late in life. Treatment was of no avail. Up to the present, just eleven months since the first operation was performed on this girl, the results seem to be promising, with one exception, and that is a low tension. History tells us that in 1897 the operation of cervical ganglionectomy was performed several times by different surgeons for glaucoma, believing that a disease of the sympathetic ganglion in the neck might be a basal cause, but according to many reports the tension remained low but a few days.

In regard to the subject of colour perception. The whole subject of colour perception must at

least embrace the subjects of physics, physiology and psychology. As I remarked before concerning our case, when a child this girl could distinguish all colours. She never had any trouble in painting with water colours at school and was able to do embroidery work with colours up to six years ago. About this time she became conscious of some trouble with her colours, the bright yellows, bright pinks and some shades of green and blue. Green is the only colour in regard to which there has been improvement. In this particular her field has become larger, but the fields for red and blue remain the same as on the first examination; both red and blue are reduced to about 3° around the fixation point each side. Why should this occur? We know that the visible radiations of light have a wave length varying from 6200 A.U. at the red end of the spectrum, to 3900 A.U. at the violet end. While these stimuli form the physical bases of the sensation of colour, we may ask what is the physiology and psychology of colour perception?

Parsons remarks that "perhaps no subject offers a better field for conjecture than the theory of colour vision," and Troland[11] says that "guessing at Nature's secrets has always been a favourite amusement of the human mind, but in no department of thought has this form of diversion been so wantonly pursued as in the theory of colour vision." In reviewing some of the newer theories of colour vision Troland mentioned that of Harold K. Schjelderup, the Norwegian, who assumes the existence in the receptor zone of three photochemic substances possessing reactivities to light similar in a general way to those of the Hering hypothesis. The thought occurred to me, might it not be possible that one or more of these have been destroyed or have not yet regenerated in this girl's retina that is now showing signs of functioning over 180° of the arc with perception for green on each side? Might that explain also the non-perception for blue and red at the present time? Time of course will tell the clinical side of the story.

Goldenburg[12] states "that capillaries are permeable has been known for many years." That they have the ability to contract and dilate has only recently been demonstrated by Krogh and his followers." He also states that "the Rouget cells, which in reality are a modified muscle layer and are found external to the endothelial tube of the capillary, have been demonstrated in the capillaries of the human eye by Schaly, of Arnheim, Holland.

Purves Stewart[13] reminds us that every organ, "whether hollow, muscular organ, blood vessel or gland, which is innervated by the vegetative system, has a double innervation, derived partly from the sympathetic proper and partly from the autonomic system, cranial or sacral. This innervation is not only a double one, but its two elements are mutually antagonistic. Under normal conditions these two forces are in equilibrium. According as the sympathetic or the autonomic influence predominates so do we have variations in the activity of the particular organ." In retinitis pigmentosa there is apparently a disturbed equilibrium, a hyperactivity of the sympathetic proper producing a vascular spasm.

Finally, we ask ourselves the question. Is all this due to some remote cause, or, is this hyperactivity of the sympathetic proper, due to chemical changes taking place in this highly specialized neuroepithelium, responsible for the spasm which produces clinically a narrowing of the vessels, an abiotrophy (Gowers) of the part and loss of function in consequence? A local fertile field for a chemical disturbance to take place. And again, can consanguinity alone explain that phenomenon? I venture to suggest that it might be due to that cause.

This girl's impressions up to date may be of interest. Just a few days before reading this paper she told me her story in these words.

> Since the operation my upper fields of vision have gradually improved. I can see better on all sides, but I am still conscious of a horizontal line which prevents me from seeing below when looking ahead. The change of light seems to be more of a confusion now, due to the fact that I am able to see more. Some days my vision is more blurry than others." Tinted glasses relieve this sensation.

In so far as the operation on the superior cervical ganglion for this condition is concerned my impressions are these. It is probably too early to state to what extent, if any, the retinæ in this girl will show evidence of further improvement. The condition seems to have been about stationary for the past two months. The improvement so far is confined to a large part of one-half of each retina. Will the operation on the other side produce, in time, a similar

improvement in the other halves of the retina? Dr. R. E. McKechnie, on October 27, 1931, did a similar operation on the right side and he found a much smaller ganglion on this side. Dr. McKechnie and I thought it advisable to defer operation on the right side until this date as both eyes gave signs of a similar degree of improvement and incidentally it gave us the opportunity to study the case. At the date of reporting no further improvement is noticed following the operation on the right side. There is no myosis, enophthalmos or pseudo-ptosis on this side, as occurred immediately after the operation on the left side.

Another question. Will the improvement so far obtained last, or will degeneration become active again? There is no doubt that in selected cases, *i.e.*, in cases in which a diagnosis has been definitely established very early and the operation performed before much degeneration has taken place there will be a greater chance for improvement. At the moment one can hardly say more than that.

Dr. McKechnie and I are sufficiently optimistic concerning this work that we intend to continue doing it as suitable cases present themselves.

We must acknowledge our indebtedness to Dr. Royle and his co-workers, and I, personally, to Dr. R. E. McKechnie for his skilful operation on this case; to Dr. C. E. Brown for the report of her general condition; to Dr. W. A. Whitelaw for interpreting the x-ray plates of the sella turcica region; and to Dr. C. S. McKee for the blood examination. To all I extend my thanks.

Note: Since the above paper was delivered the writer communicated with Prof. S. E. Whitnall, of McGill University, concerning the question of a better approach than that offered through the superior cervical ganglion in order to get the complete sympathetic supply to the blood vessels of the eyes. Prof. Whitnall very kindly replied as follows.

"I cannot suggest any better or simpler operation to affect the blood vessels of the eye than removal of the superior cervical ganglion, for there is no advantage in going below this region for this purpose, and the 'stellate ganglion' is far harder to reach. The only other sympathetic path might be along the vertebral, basilar, posterior communicating (of circle of Willis) internal carotid to ophthalmic artery—theoretical, but hardly of such practical importance as the shorter route along the internal carotid nerve from the superior cervical ganglion direct. There is a 'stellate ganglion' in the cat and dog = upper 4 thoracic gg., but in man it is represented by the connections of the inferior cervical g. and first thoracic ganglion."

As to why there was no Horner's syndrome following the second operation on the right side similar to that on the left Prof. Whitnall makes the following remarks: "The right sup. C. G. being found much smaller than the left and no Horner's syndrome having followed its extirpation would point to the conclusion that some of its cells have migrated along the internal carotid plexus to form a 'carotid ganglion' inaccessibly situated in the carotid canal of the petrous bone, as is known to occur. For this reason the totality of expected effects by removal of the sup. C. ganglion can never be certain."

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THALLIUM POISONING.—The report of H. M. Ginsburg and C. E. Nixon deals with 11 cases of poisoning from the use of barley mixed with thallium sulphate for use as a rodent poison. After the barley had been ground, tortillas (a Mexican bread made by mixing flour and water and rolling the dough into thin cakes) were made from the whole grain. These patients gave a uniform history of onset of symptoms twenty-four hours after partaking of the tortillas. The first symptoms noticed were a tingling sensation and pains in the hands and feet, followed by severe paroxysmal abdominal pains and vomiting. No diarrhœa was observed. Shortly after the first manifestations, weakness of the extremities developed. This weakness did not involve any particular muscle group except that it was more marked peripherally than proximally. Patients were afebrile but with an acceleration of the pulse rate. The blood picture in the first two to five days was normal. The urine showed traces of albumin and hyaline casts. In all cases there was a marked stomatitis. Some exhibited a purplish line at the junction of the teeth and gums. Marked salivation was present in all cases. Bleb-formation appeared on the lips; the breath was foul. Within two to five days after the onset, all patients showed evidence of cerebral involvement manifested by cranial nerve palsies and disturbed sensorium and choreiform or myoclonic movements of the extremities and the head. Among the cranial nerve manifestations, ptosis, strabismus and dilated pupils which reacted feebly to light were prominent. Falling out of the hair occurred in all these patients at this time. The deep reflexes varied from time to time in the individual patient as well as in the different patients. In no instance were they lost and at times they were exaggerated. No pathological reflexes were present. In the more toxic cases convulsions occurred, which were followed by a marked delirium, after which patients became comatose and died of respiratory failure. Within twenty-four to forty-eight hours prior to death there was an elevation of temperature up to 103° F. with pathological changes in the chest indicative of a bronchopneumonia or pulmonary œdema. In the treatment of these patients the authors used sodium thiosulphate intravenously, 1 gm. doses twice a day for adults, and 0.5 gm. doses for children. After this treatment was discontinued because of its apparent failure, sodium iodide was similarly given in 2 gm. doses. Two of the patients were given calcium lactate and parathyroid extract. In addition to these, dextrose and salt solutions and other symptomatic therapeutic measures were used as indicated.—*J. Am. M. Ass.*, 1932, **98:** 1076.

BLINDNESS FROM METHYL ALCOHOL SUCCESSFULLY TREATED BY LUMBAR PUNCTURE

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FORTY years ago blindness from methyl alcohol was practically unknown. From that time onward it has become more and more frequent, so that in 1920 Edward Jackson[1] made the statement that methyl alcohol caused as much blindness as all other toxic causes put together. The reason for this, of course, was that with the growing use of alcohol in the industries the price of grain spirit had risen to such a point that it was very profitable to use a substitute, and for most purposes methyl spirit answered admirably and cost very much less. This legitimate use of methyl spirit was not adhered to, but in certain preparations, such as extract of Jamaica ginger, bay rum, Florida water, painkiller, etc., this spirit was used instead of grain spirit, with disastrous results, for in places where ordinary intoxicants are prohibited, such as in the far North and on Indian reservations, these are the standard exhilarants. Prohibitory temperance legislation, too, has caused such a rise in the price of ordinary liquors that aduleration with methyl alcohol is very common. Then, too, as methyl alcohol looks like grain alcohol and will produce intoxication, ignorant people are apt to drink it, as it is so much easier to get hold of than grain alcohol.

There is no doubt that individuals vary much in their susceptibility to this alcohol. Some have an idiosyncrasy to wood alcohol and are affected by comparatively small doses, while others seem to be relatively immune from repeated large quantities. I have seen poisoning result from the vapour of methyl alcohol when used in varnish in a confined space, such as a large beer vat. A few cases have been reported where enough was absorbed through the skin, to produce serious symptoms. One teaspoonful of methyl alcohol has been known to cause permanent blindness and one ounce to cause death.

The symptoms are rather characteristic. Usually, the victim becomes intoxicated. On regaining consciousness, he gets cramps in the abdomen with vomiting, and suffers loss of vision. After three or four days the vision begins to come back and fairly good sight is regained, only to diminish rapidly until useful vision is permanently lost. However, not all cases follow this typical course. The case to be reported is as follows:—

CASE REPORT

The patient, T. F., was a man of 34. He was an accountant in England, but for some time had been working as an orderly in the Montreal General Hospital. His eyesight had always been good.

On September 28, 1931, he had an attack of influenza. On October 1st, as he was feeling miserable, he drank 2 oz. of "rubbing alcohol" obtained from one of the wards. This alcohol had been made up by adding 25 per cent of water to pure methyl alcohol. He took his drink in water at about 8 p.m. The following morning he felt rather worse and at 6 a.m. took a second drink of 2 oz. At noon his vision began to fail and by 3 p.m. he could only see shadows. The next morning, October 3rd, he went to the medical clinic complaining of loss of sight, but said nothing of having drunk the rubbing alcohol. The bottle was labelled POISON and all the orderlies had been warned that the rubbing alcohol, as it was being supplied to the wards, was 75 per cent wood alcohol. At that time he complained also of headache and lassitude, but had no abdominal pain. His vision was reduced to counting fingers at three feet. The impression of the medical man was that his trouble was functional.

On October 5th, Doctor Alexander saw him at 2 p.m. and found slight dilation of the pupils, hippus, and sluggish reaction to light; central vision was hand movements only, but, the peripheral field of vision showed no contraction. There was slight blurring of the discs, more marked on the temporal border, and more pronounced in the right eye. The retinal vessels were normal. The blood pressure was 118/78. He was admitted to the eye ward and given pilocarpin sweats.

I saw him for the first time on October 6th and ordered lumbar puncture at once. Eighteen c.c. of cerebrospinal fluid were withdrawn, and this was repeated on the three following days, till 74 c.c. had been removed. The amount of cerebrospinal fluid withdrawn was controlled by a water manometer, the slow drainage being stopped when the pressure was reduced to 100 mm.

Vision began to improve, chiefly in the left eye, after the second lumbar puncture. On October 22nd: R.V. = counting fingers at 2 in., but looking obliquely he could count fingers at four feet; L.V. = 6/18ths and he was able to read fairly fine print. On November 5th, *i.e.*, 35 days after the first dose of alcohol: R.V. and L.V. = 6/6 and reading fine print. This normal vision has been maintained. On October 22nd beginning optic atrophy and arterial sclerosis were noticed in both eyes. On November 5th a well defined atrophy could be seen. The retinal arteries now are narrowed, their walls much thickened, and their calibre markedly irregular. In view of its normal function, one can reasonably conclude that much of the pallor of the optic disc is

vascular in origin. Very early it was found that the central vision was damaged while the peripheral field was intact.

Bongers, investigating the metabolism of methyl alcohol, found it was excreted by the gastric glands and, further, that the quantity recovered on the second and third day was three times as great as that on the first . Hence gastric lavages, to prove of maximum value, should be continued for four or five days.

The researches of Keeser and Schroback[3] in 1931 showed that the methyl alcohol is broken up in the body into nascent formaldehyde and formic acid, and, that this change takes place very early in the brain and in the optic nerve. It is this formaldehyde which is so destructive to living cells. The analysis of the spinal fluid in our case supports Keeser's work. Normal spinal fluid contains 0.05 to 0.06 per cent of reducing agents. The cerebrospinal fluid in our case showed an increase in contents to 0.086 to 0.098 per cent. This increase is most probably due to above mentioned incomplete combustion products of the ingested methyl alcohol.

From Birch-Hirschfeld's experimental work on dogs and monkeys it was found that the retinal ganglion cells of the macular area were most vulnerable, as they were the first to show chromolytic changes. This was soon followed by secondary degenerative changes in the papillo-macular bundle as far back as the basal ganglia. The central loss of vision while the peripheral fields remained intact, and the first appearance of œdema in that sector of the optic nerve corresponding to the papillo-macular bundle in our case, would clinically tend to support these findings.

I have seen many cases of methyl alcohol blindness but never before did I see one recover good vision. In fact, all were quite blind permanently, except one in which a moderate degree of vision was restored. The favourable outcome of this case leads me to believe that in lumbar puncture we have a method of treatment that is very promising in a condition in which hitherto the prognosis has been on the whole extremely bad. This belief is greatly strengthened by reading the report of Hamalainen.[2] This author gives an account of a typical methyl alcohol "spree", so I will quote him somewhat fully. A laboratory servant stole 2½ litres of Merck's methyl alcohol. He diluted it with water to 50 per cent and added sugar. He then gave a series of parties to seven of his friends with the following results:—

Patients Nos. 1, 2 and 3 had no untoward symptoms. These drank 100 to 200 c.c. of the mixture. Patients 4 and 5 had transitory indisposition, vomiting, weakness and intoxication; No. 4 drank 100 c.c.; No. 5 100 c.c. three times, the first time with no ill effect, the second with simply intoxication, the third with vomiting and headache. None of these five showed any ill effect one week later, and none had any disturbance of vision.

Patient No. 6 drank 400 c.c. of the mixture at one session. He was not intoxicated but felt depressed, next day vision began to fail and got steadily worse. Only after a week did he come to the clinic. Vision in each eye = finger-movements at ½ metre. Choke disc in both eyes with paracentral scotoma. Treatment: diuretin with a large quantity of fluids and sweating. Eleven days later V=F at 4 metres; very little improvement. Lumbar puncture was then performed. The very next day V=5/15 in each eye. One week later V= the same, second lumbar puncture done and the very next day V=5/7.5 in each eye and four days later 5/5 in each eye. Fields normal. Six months later the same.

Patients 7 and 8 died. The 8th patient was the donor of the party.

Hamalainen cites the paper of Zethelius and Wersen,[4] published in 1920, and makes the following statement:—

"Most remarkable in this case and in that published by Zethelius and Wersen is the spectacular effect of the lumbar punctures. The vision in both cases was greatly improved on the day following the puncture, then remained unchanged for some days, and after a second lumbar puncture became normal."

It is clear from a study of these cases and of our own that the action of the formaldehyde on the cells of the optic nerve and retina is at first not so great as to cause the death of the cells, but is strong enough to cause marked dysfunction. The actual change in the cells is probably œdema. This at least would explain the remarkably rapid reaction to the lumbar puncture. Fridenberg[5] states that there is an intense œdema with some neuritis, rapidly followed by atrophy of the optic nerve.

It is also clear that, while this poison will

eventually kill these cells, as has resulted in hundreds of cases, still some length of time must elapse before this happens, or, putting it in another way, the formaldehyde keeps on exerting its deleterious action for a long time.

From a consideration of all the facts we would advise that the following treatment be instituted as soon as possible.

1. Repeated gastric lavage during the first four or five days to remove the alcohol excreted by the gastric glands.

2. A large fluid intake to dilute the poisons circulating in the blood stream.

3. Pilocarpine sweats and hot packs daily to aid elimination through the skin.

4. And most important, the withdrawal of as large an amount of cerebrospinal fluid as possible daily, 4 to 5 days. The pressure should not be allowed to fall below 100 mm. water, to dilute and mitigate the attack of the poisons on the central nervous system especially the eye.

This treatment, of course, is to be used whether the eyesight is damaged or not.

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A CASE OF FRIEDLÄNDER'S PNEUMONIA*

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THE case of Friedländer's pneumonia which is here presented is considered to be of some general interest, not only because it is a typical example of a rather rare form of pneumonia but also on account of the fact that very favourable opportunities for bacteriological studies were presented. In this report the clinical and pathological findings are described, but chief consideration is given to the bacteriological aspects which are believed to be worthy of special attention.

The following are the details of the case:—

Mr. D. (Hosp. No. 6463/31), an adult, white, male, 42 years of age, was admitted to the service of Dr. C. A. Peters at the Montreal General Hospital on November 10th, 1931.

Complaints were cough with expectoration, pain over the right chest aggravated by deep breathing, chills, warm flushes and sweats, and generalized pains and stiffness. The illness was of three days' duration.

The *family history* was irrelevant.

Personal history.—He had had influenza in 1917. In 1928 he was admitted to hospital with an infected lacerated wound of the lower lip. During his stay in hospital he developed an attack of delirium tremens. In 1929 he was again admitted, suffering from lobar pneumonia involving the lower left lobe. Pneumococcus Type II was obtained from the sputum at that time. The temperature fell gradually by lysis and resolution of the consolidated area was slow, but resolution was apparently complete and there were no sequelæ. He had been subject to frequent "colds in head and chest."

Present illness.—The patient was well until three days before admission when, on rising in the morning, he "felt poorly", vomited, soon began to suffer from headache, and had chills, warm flushes and sweats, cough and expectoration. He attributed this to exposure to inclement weather two days previously. Since the onset of the illness he had remained in bed the greater part of the time. Expectoration had been profuse. There was generalized soreness and stiffness and a severe pain in the right chest which was aggravated by breathing. The exact time of onset of these latter symptoms could not be determined.

Physical examination.—The important findings on admission were as follows: The patient appeared extremely ill. There was frequent cough with expectoration. Cyanosis of the ears and lips was present. Temperature, 101.4°; pulse, 96 per minute; respirations, 32 to 44. Mild conjunctivitis was present. There was no herpes. The teeth were dirty, the tongue was dry and coated, and the pharynx reddened.

The chest was emphysematous. There were typical signs of consolidation over the upper part of the right chest down to the third interspace in front and the fifth rib behind. The right base presented only moist râles. A friction rub was present high up in the right axilla. The left lung was clear, except for occasional scattered moist râles.

The pulse was rapid, of fair volume; blood pressure, 108/64; possibly a slight displacement of the heart to the left. The abdomen presented moderate distention. There was slight tenderness and resistance to palpation in the right upper quadrant. The liver was thought to be slightly enlarged on palpation and percussion. The spleen seemed to be enlarged on percussion but could not be palpated.

Examination of the other systems revealed no abnormalities. The urine showed some albumin; the laboratory findings otherwise were negative.

Progress notes.—Cough and expectoration became more marked, the temperature ranged between 101.4° and 104.4° and, the day following admission, signs of consolidation appeared at the base of the left lung. The patient's condition became steadily worse and he died 38 hours after admission to the hospital, on the sixth day of the illness. Administration of Felton's concentrated antipneumococcus serum, Types I. and II., was commenced shortly after admission, and a total of 60,000 units of each type was given without appreciable effect on the course of the disease.

Post mortem.—(A-31-236.) Apart from the changes

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in the pleuræ, lungs and bronchi which are described in some detail, the abnormal findings were:—marked cyanosis of the face and finger-nail beds; bloody frothy material exuding from nostrils and mouth; a moderate degree of early atheroma of the aorta; a few small areas of sclerosis and lymphocytic infiltration in the left kidney and the usual changes seen in an acute toxæmia—cloudy swelling of the liver, kidneys and adrenals and large soft dark red congested spleen. There were no evidences of localized foci of acute infection in any part of the body except the respiratory tract.

Each pleural cavity contained about 300 c.c. of dark hæmorrhagic fluid. There were no adhesions on the left side. On the right side recent adhesions were present at the apex and anteriorly. The pleural surface of the upper lobe of the right lung presented a shaggy appearance. Elsewhere over the right lung and over the left lung the pleura appeared normal in the gross.

The right lung weighed 1,250 grm. The upper lobe was greyish-red in colour, uniformly firm and solid in consistency and non-crepitant. The cut surface exuded a large amount of mucinous greyish purulent material. The slimy slippery feel of this cut surface was a prominent feature. The middle and lower lobes showed congestive changes, more marked in the lower lobe, without evidence of true consolidation.

The left lung weighed 800 grm. Both lobes showed large patchy greyish areas of consolidation, with the intervening areas of lung congested but still only subcrepitant. These areas of consolidation presented the same characteristics as the diffusely consolidated upper lobe of the right lung. On both sides the bronchial passages showed acute inflammation of the lining membranes with bloody purulent material in the lumina.

Microscopic examination of sections taken from various portions of both lungs presented the following features. In all sections there was evidence of some degree of acute fibrino-purulent exudation over the pleura, most marked over the upper lobe of the right lung. Sections from consolidated areas showed marked vascular congestion and a very cellular exudate completely filling the lumina of the alveoli. This exudate consisted of approximately equal numbers of polymorphonuclear leucocytes and large mononuclear cells and varying amounts of fibrin and extravasated red blood cells. The proportion of fibrin and red blood cells in the exudate varied considerably in different alveoli. In some these elements were scarce, while in others they formed a very conspicuous portion of the alveolar contents. Sections from congested areas presented a picture differing from that in the consolidated areas, chiefly in the predominance of a coagulated serous material over cells and fibrin in the alveolar exudate. Anthracotic pigment was everywhere abundant.

Bacteriological studies.—The Friedländer's bacillus was obtained from three sources in this case—the sputum (ante mortem), the ante-mortem blood culture and the post-mortem blood culture.

The sputum, which was brought up by the patient in large amounts, consisted of dark red blood-stained fluid of watery consistency in which were suspended large masses of stringy mucoid yellowish material streaked with red blood. Direct smears of sputum, which had been washed in normal saline several times to remove adherent saliva, showed considerable amounts of stringy mucus, "pus cells" and large numbers of the organism which is to be described presently and was identified as the Friedländer's bacillus. Very few other organisms were to be seen in these direct smears and when washed sputum was plated upon solid media almost pure cultures of the Friedländer's bacillus were obtained. A white mouse, inoculated intraperitoneally with washed sputum, was very toxic 28 hours after inoculation and when killed at that time pure cultures of Friedländer's bacillus were obtained from the heart's blood and the peritoneal exudate.

Blood culture, taken 10 hours before death, yielded a pure culture of the Friedländer's bacillus. Since the organism grew only on the broths and not in the blood plates no estimation of the number of organisms per cubic centimetre of blood could be made.

Blood culture taken from the heart 10 hours *post mortem* also yielded a pure culture of the Friedländer's bacillus. The blood plates showed growth in this culture and it was estimated that there were from 30 to 40 colonies in plates containing about 0.25 c.c. of blood.

The organisms obtained from these three sources were identical and there was no evidence that they did not represent one and the same species of organism. The organism presented a bacillary form with considerable variation in length. Some forms were quite long, so as to leave no doubt that the organism was a bacillus, while others were coccoid in form. They invariably showed a Gram-negative staining reaction. No motility could be demonstrated. Capsular development was very marked, especially in the sputum of the patient, and in the heart's blood and peritoneal exudate of inoculated mice. There was a tendency for the capsules to become less marked in subcultures on artificial media. The capsule could be seen clearly in smears stained by Gram's method in which it formed a very thick, clear, faintly pink stained envelope with a sharp border (Fig. 1). Frequently two or three bacilli were enclosed in a common capsule. In smears stained by Muir's method the bacilli were red and the capsule blue.

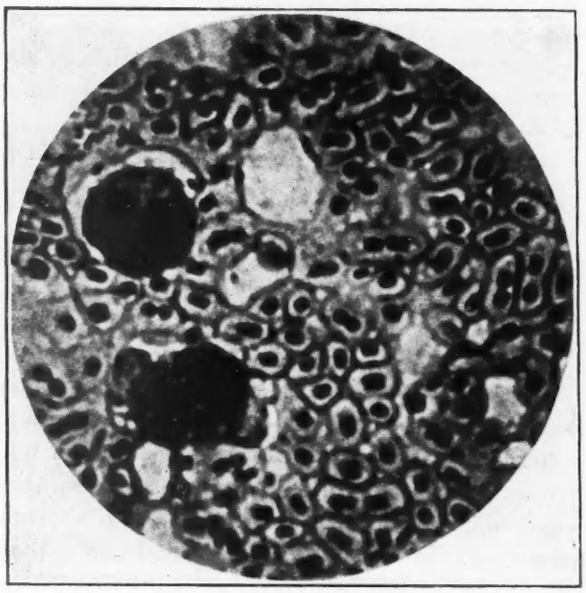

FIG. 1.—Photomicrograph of smear from peritoneal exudate of mouse which had been inoculated intraperitoneally with patient's sputum (x 2000 approx.) Note capsules.

At body temperature the organisms grew luxuriantly under aërobic conditions on the simpler laboratory media such as plain meat extract broth and plain agar, as well as on media enriched by the addition of blood. On solid media, plain agar, blood agar and potato, the colonies presented a colourless translucent glistening appearance and a mucoid viscid consistency, with a tendency for fusion of colonies to occur, producing an irregular confluent growth. On litmus milk very slight acidity with no coagulation was produced. There was no indol formation from Dunham's peptone solution. The fermentation reactions on sugar media were: dextrose—acid, no gas; saccharose—acid, no gas; lactose—no fermentation; maltose—slight acid, no gas; mannite—acid, no gas.

The bacterial suspension, obtained by washing out the peritoneal cavity of a mouse which had been inoculated with the sputum, was tested with Types I., II. and III. antipneumococcus sera. No precipitation or agglutination occurred. Intraperitoneal injection into a white mouse of 1 c.c. of a suspension of the pure culture of the organism of approximately the same turbidity as a 48-hour broth culture produced death of the mouse 8 hours after inoculation. The organism was present in pure culture in the peritoneal exudate and heart's blood of the mouse.

DISCUSSION

It is now generally accepted that the Friedländer's bacillus may either be the primary cause of a pneumonia or occur as a secondary invader in pneumonia due primarily to some other organism. In the case reported, no other possible causative organism was found in association with the Friedländer's bacillus, which was apparently the primary and sole etiological organism. On the basis of cases reported before 1915 Sisson and Thompson[1] stated that the Friedländer's bacillus appears to play a part in the causation of from 5 to 10 per cent of all pneumonias, including both those cases in which it is the primary etiological agent and those in which it is a secondary invader. In a recent paper Fremmel, Henrichsen and Sweary[2] gave this incidence as 1 to 8 per cent. In a series of 2,000 cases of lobar pneumonia reported by Cecil, Baldwin and Larsen[3] there were 9 cases (0.4 per cent) in which the Friedländer's bacillus alone was the cause and another 9 cases (0.45 per cent) in which it occurred in association with the pneumococcus—a total of less than 1 per cent. Clinically, the most striking features of Friedländer's pneumonia are the rapidity of its course and the almost invariably fatal termination. As a rule death occurs from two to five days after the onset of the illness. However, cases of pulmonary infection by the Friedländer's bacillus running a chronic course resembling pulmonary tuberculosis have been described and, as opposed to the usual high mortality, Zander[4] reported an epidemic of the disease in which the mortality was only 35 per cent.

On post-mortem examination, Friedländer's pneumonia may show either a "lobar" or "lobular" type of involvement of the lung. As a rule the initial process is lobular with a later confluence of the lobular areas producing a more or less diffuse involvement. In the case reported here, signs of consolidation were already present over the upper right lobe on admission and at post-mortem examination this lobe showed a diffuse "lobar" type of involvement. Signs of consolidation in the left chest did not appear until the day after admission and on this side, where the consolidation was therefore more recent, a patchy type of involvement was found at autopsy. It seems probable that the sequence of events in the right upper lobe was an initial patchy type of involvement with later confluence of the consolidated areas producing the diffuse "lobar" type of involvement. A striking pathological feature of the lung is the mucinous character of the exudate. This gives to the cut surface a moist sticky slimy feel. This cut surface yields a clear or bloody mucus on scraping. The more important microscopic features, which have been emphasized in numerous reports in the literature, are the presence within the alveoli of considerable numbers of large mononuclear cells as well as polymorphonuclear leucocytes and the scarcity of red cells and fibrin as compared with cases of pneumococcal pneumonia. In our case mononuclears were present in considerable numbers, although they did not constitute a very striking feature, and red cells and fibrin were quite abundant.

The bacillus of Friedländer, or the *B. mucosus capsulatus*, the etiological agent in Friedländer's pneumonia, is a member of the colon-typhoid group of bacteria and shares with the other members of this group the following characteristics—a bacillary form, a Gram-negative staining reaction, facultative aërobic qualities, and inability to form spores. The name "bacillus of Friedländer" refers to the fact that the organism was first described by Friedländer in 1882. This investigator, confused by the superficial resemblance between pneumococci and this bacillus, and in fact describing it as a micrococcus, believed it to be the common incitant of lobar pneumonia. It was not until several years later that the pneumococcus group and the bacillus of Friedländer were clearly differentiated, and it was recognized that the latter causes pneumonia only very rarely. The name *B. mucosus capsulatus* draws attention to the two most prominent and distinctive features of the organism, namely, the marked degree of capsular development and its power of producing large amounts of mucoid material in its growth both on artificial media and in the human body.

It is now recognized that organisms presenting the same characteristics as those of the Friedländer's bacillus isolated from the rare cases of Friedländer's pneumonia may be found in various situations in the human body. Such organisms may occur as apparently harmless saphrophytes or in association with a number of widely different disease processes. Thus these organisms have been found occasionally in the nose, throat and alimentary tract of apparently healthy individuals. They are frequently to be found in association with inflammation of the nasal sinuses, bronchitis and otitis media, apparently

as an etiological agent. They have been discovered in serous cavities, giving rise to pleurisy, pericarditis and peritonitis, as the case may be, and cases of septicæmia due to the Friedländer's bacillus have been reported. Claims have been made that this organism plays a part in the causation of rhinoscleroma and ozæna.

The diversity of the clinical pictures of the diseases in association with which this organism may occur is a striking feature. It may be associated with a condition such as an acute Friedländer's pneumonia of the type reported, in which the disease runs a rapid course with an early fatal termination. In contrast with this, it may be found in association with as chronic a condition as ozæna. It must be borne in mind, however, that an etiological relationship has not been definitely established between the Friedländer's bacillus and these more chronic conditions.

It is now appreciated that for the terms "Friedländer's bacillus" and "*B. mucosus capsulatus*", one might substitute the terms "the Friedländer group" and "the mucoid encapsulated group" of organisms and that there are a number of members of this group. However, differentiation of the members of this group one from another and even the group itself from other colon-typhoid organisms by agglutination tests, fermentation of sugars and other special methods has not been successful. Differentiation of the Friedländer group from other members of the colon-typhoid group still must be based upon the characteristics of marked mucus production and the high degree of capsular development presented by the Friedländer group. The differentiation of the various strains or species within the Friedländer group cannot be made as yet. The organism isolated in the case presented in this report was identified as a member of the Friedländer group, or mucoid encapsulated group, on this basis.

SUMMARY

A case of Friedländer's pneumonia is reported. The clinical, bacteriological and post-mortem findings are described and discussed. Special consideration is given to the bacteriological aspects of the case. The Friedländer's bacillus was isolated from the patient's sputum in almost pure culture and from the ante-mortem and post-mortem blood cultures in pure culture.

The author wishes to express his obligation to Dr. L. J. Rhea for his supervision of the work on which this paper is based, and to Dr. C. A. Peters for permission to make use of the clinical records in this case.

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THE EFFECT OF SMOKING ON BLOOD SUGAR.—Drs. E. and S. Thyselius-Lundberg, in a study of the effect of tobacco smoking on the blood sugar, have provided information of practical clinical importance on the action of nicotine in man. They observed the effects on healthy persons and diabetics produced by smoking two to four cigarettes; both smokers and non-smokers were tested. In all cases smoking caused a well-marked increase of the blood sugar, which, rising quickly immediately the smoking commenced, regained normal level after about half an hour. In most cases the blood sugar rose about 15 per cent above its initial value, but in one case there was a constant rise of 50 per cent. No change occurred with nicotine-free cigarettes. The reaction of diabetics to nicotine was greater than that of normal individuals, therefore they should smoke in moderation. These experiments also show that smoking may be a source of serious error in blood sugar estimations. Another point of interest is that here is a method for measuring the physiological action produced by moderate smoking in habitual smokers. The authors believe that the effect observed is caused by the stimulation of the suprarenals by nicotine, with the subsequent liberation of adrenaline.—*Brit. M. J.*, 1932, **1**: 392.

IMMEDIATE CÆCOSTOMY AND CONSTANT LAVAGE IN MERCURIC CHLORIDE POISONING.—In an analysis of 163 cases of mercury poisoning at the Mount Sinai Hospital of Cleveland, S. S. Berger, H. S. Applebaum and A. M. Young noted a number in which the patients survived the usual gastric and renal damage but succumbed to a gangrenous colitis. This lesion was apparently successfully prevented in three cases by constant colonic lavage following cæcostomy done within a few hours after the ingestion of the poison. The authors believe that immediate cæcostomy and constant colonic lavage is the most effective measure for the prevention and treatment of the gangrenous colitis. By immediate cæcostomy is meant its performance as soon as the patient is admitted, provided he is not in extreme shock. The diagnosis of mercury poisoning is first established by the detection of mercury in the gastric lavage by the electrolytic method of Booth and Schreiber, which can be done in a few minutes.—*J. Am. M. Ass.*, 1932, **98**: 700.

IRRADIATION THERAPY; ITS SCOPE AND PRACTICAL APPLICATION*

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FROM the standpoint of our discussion to-day, irradiation therapy refers to the use of the physical agents, x-rays and radium, in the treatment of cancer and allied diseases. Since misunderstanding of the relative application of these two agents frequently exists, it will be well to define their position clearly. There is no practical overlapping of their fields of usefulness. They are not antagonistic. They are very much dependent upon each other. X-radiation is obviously limited to external application and lends itself particularly to use over extensive body surfaces—external radiation in wholesale form. Radium, on the other hand, is an agent for limited external use, except in a manner to be discussed later,—for application within body cavities, and especially for direct implantation within tissues.

From a strictly physical standpoint there is a difference in the quality of the two types of radiation. The gamma rays of radium are shorter than the most effective x-rays so far produced. Gamma rays are therapeutically more effective as compared with x-rays, if comparable quantities of the two agents are considered. But the supply of radium is limited. For extensive use rather elaborate equipment and a highly trained personnel are essential. X-radiation, on the other hand, is relatively inexpensive. More machines can always be added as the need arises. There are many men throughout the country competent to operate such equipment. This is particularly important in a practical way, so far as meeting the immediate needs of cancer-therapy is concerned. These statements refer specifically and entirely to the agent preferable for external irradiation. For this purpose good x-ray therapy is always preferable to mediocre radium therapy.

A large quantity of radium, for external therapy only, is a very valuable adjunct to the equipment of a large cancer hospital or institute. It furnishes in sufficient quantity for practical purposes a supply of the most efficient quality of radiation known. Its potential is constant; the factors involved from a physical angle do not vary from day to day, as with x-radiation. It is a constant standard with which may be compared, clinically and experimentally, other types of radiation. It is a guide, a stabilizer, and a stimulus, ultimately, to the production of higher-powered x-ray equipment. For this sort of work, a unit of 4 grams of radium at least is necessary. There are a few of such units in operation; one at the New York State Institute for Cancer Research at Buffalo; one at Memorial Hospital, New York; one in London, and two or three on the Continent. Our four-gram pack at the Memorial Hospital represents an overhead investment of nearly $350,000. Considering some of the largest doses employed, it would not be possible to treat more than 200 to 300 patients per year with it. Apart from the economic considerations, it is, physically, an extravagant method of using radium, since only one beam of the energy emitted is actually made use of. It serves a very useful purpose in a cancer institute, but is not applicable to the general problem of external radiation in cancer, except indirectly. From a practical point of view, therefore, x-rays must be looked to as the source of energy for external irradiation. Radium must be reserved for application within the body cavities and for implantation within tissues.

The dependence of one agent on the other, however, cannot be overemphasized. External irradiation is limited in its intensity by the skin reaction beyond which burn results. One of the outstanding recent advances in irradiation therapy has been the determination of quantitative dosage measurements for certain types of epidermoid carcinoma, a piece of work carried out by Martin and Quimby of the

* Read at the sixty-second annual meeting of the Canadian Medical Association, at Vancouver, June 25, 1931.

Memorial Hospital staff. They have shown certain minimum standards of dosage, quantitatively, below which the given type of tumour continues to grow. In other words, for certain types of growth, the minimum lethal dose has been determined with reasonable accuracy.

Only a very few of the epidermoid carcinomas are sufficiently radiosensitive to be controlled completely by the quantity of radiation which it is possible to deliver by external irradiation alone. Other means must, therefore, be resorted to in order to raise the intensity of the irradiation within the tumour-bearing area to the point which is known to be lethal for that particular type of growth. It is for this reason that direct implantation into the growth of radiant energy, in some form, must be employed. Radium in the form of element needles or emanation (radon) seeds is the agent for this type of application. Similarly, the use of heavily-filtered tubes of radium element or emanation may be resorted to in certain of the body cavities, e.g., cervix uteri.

It is interesting to note the increasing accuracy with which irradiation is being carried out. The accurate dosage determination is a stride in advance. Recognition of relative degrees of radiosensitivity through histological study has come to have a very large and important bearing on methods of irradiation. It is frequently possible to give a fairly shrewd appraisal of the probable reaction of a given tumour to irradiation through histological study of the slide. This problem is too extensive and too important to be taken up here. It should not, however, be passed over, leaving the impression that a rule-of-thumb has been devised for the pre-determination of relative radiosensitivity through histological study of a biopsy specimen alone. Many clinical factors must be correlated with this direct study by the pathologist. The age of the patient, the location and extent of growth, the size and duration of growth, and the general nutritional status of the patient are all important factors—along with many others. It does emphasize the need for consultation between clinician and pathologist. In fact, the pathologist of to-day must of necessity become somewhat of a clinician. The two fields not only meet, they blend.

Once the dosage intensity has been determined upon, it then becomes a problem in physics, geometry and mathematics to determine how best that dose may be administered. The problem is one for the physicist; it is beyond the realm of the clinician. In the everyday routine of carrying on irradiation therapy, the clinician, whether he be surgeon, radiologist, or both, must be supported on the one hand by the pathologist and on the other by the physicist.

It is rather outside the scope of this paper to outline, except briefly, the forms in which radium may be used to best advantage. External applications for skin work and tubes for cavity work are all more or less alike, or may be so fashioned, whether radium element or radium emanation (radon) is used. The active agent, gamma radiation from radium-C, is the same in each instance. For interstitial implantation some clinics prefer element needles of varying size and strength. It has been our experience at the Memorial Hospital that filtered radon seeds (filter 0.3 mm. gold) afford a much more satisfactory means of interstitial irradiation and that they have a very much wider range of application.

After thus outlining briefly the relative position of x-rays and radium from physical, economic and practical standpoints, it is evident that they are not in conflict. It is also evident that the relative value of either agent is materially enhanced in most instances by the aid of the other. For example, a resistant epidermoid carcinoma at the base of the tongue, known by experience to require 7 to 10 skin erythema doses of radiation for its control, would be a failure if dependent upon x-radiation alone. Not more than 4 skin erythema doses at most could be got into it by x-radiation within the limits of skin tolerance. The extra intensity, however, (3 to 7 skin erythema doses) might very readily be made up by direct implantation of a properly calculated intensity of radon seeds, and a successful result obtained. But, it must also be borne in mind that, after eliminating the skin growths, relatively few cases of cancer are manageable in their entirety by physical agents alone. Carcinoma of the cervix uteri probably comes nearer to it than any of the other major groups of cancer. For the most part, however, operative surgery plays a rôle somewhere in the course of the average cancer case.

We must not lose sight of the fact that cancer is essentially in the surgical field. The only methods or agents at our disposal to-day for the treatment of cancer are operative surgery, including the various cauterization measures, x-rays and radium. The best treatment to-day lies in a combination of these rather than in an attempt to push any one too far and ignoring the benefits to be derived from the others. Advancement is in the direction of a better understanding of the ways and means of combining surgery, x-rays and radium. The radiologist must be a surgeon, or be at least "surgically-minded". The surgeon must be adept, radiologically, or he should not assume the entire responsibility for the cancer patient.

In other words, the present-day cancer clinician represents a new type of special practice. The older conception of operative surgery in cancer must be changed and replaced by what might well be termed modern "cancer surgery". The very extensive mutilating operations are steadily decreasing. The terminal period operations, done on the plea that something must be attempted, are no longer justifiable. Operative removal of tumour tissue in general is becoming more conservative. In some few groups, particularly carcinoma of the cervix uteri, the operative procedure is replaced by irradiation. In others, such as carcinoma of the fundus uteri —a different disease histologically, anatomically and in its natural history from cervix cancer,— surgery, or surgery preceded by irradiation, continues to be regarded as the treatment of choice. The use of radiation by implantation within tissues has necessitated many new operative procedures. Accuracy in radium implantation is imperative if success is to crown the effort. Surgical exposure of the tumour-bearing area is frequently necessary, such as in treating inoperable metastatic nodes of epidermoid carcinoma in the neck by radon implantation. It may be possible to control an area of growth with radium, but lose the case from infection, unless surgical drainage of blocked-up infection is provided. This is a problem of frequent occurrence in dealing with cancer of the maxillary antrum and accessory sinuses. Median laryngotomy often facilitates radium implantation within the larynx. Lateral pharyngotomy, after the technique of Trotter, is an aid to treatment of certain growths in the hypopharynx. Many a contemplated radical operation for removal of a tumour may be turned from failure to at least a possibility of some degree of success if, when an inoperable extension is encountered, radon seeds are available for implantation. The best chance for treatment of many such conditions is lost when radium in some form for implantation is not available in the operating room when the difficulty is met with. Then the wound must be closed, only to be sent on later to the radiologist. The actual amount of surgery done is probably just as great as formerly, but it is more conservative, the mortality is markedly lessened, it is far more generally acceptable, and the results better. Not only is the curability increased, but the relative amount of added palliative benefit is worthy of special mention. It is in this closer combination between surgery and irradiation that most hope for the future, the immediate future at least, lies.

The term "cancer" covers a large group of closely-allied diseases, but each with its own peculiar course. The intensive study of cancer to-day is constantly throwing new light on the peculiarities of these various groups of neoplastic disease. Irradiation is steadily coming to a stage of greater accuracy; the empiric period is past. It is our problem and responsibility, with the guidance of this ever- increasing fund of new information, to make the finest possible adjustment between operative surgical measures and irradiation in their combined application to the peculiar needs of the individual patient.

How may this adjustment be managed to best advantage? There seems to be a general impression amongst the laity, in communities with no special cancer-therapy facilities, that the acquisition of a supply of radium solves the problem. Within the medical profession, radium is often seriously considered, but support through adequate x-ray therapy facilities, ignored. Unfortunately, the therapeutic equipment, no matter how adequate, is but a small part of the necessary organization. A very carefully planned organization of the cancer unit to meet the needs of the individual community is essential if many of the pitfalls of the past are to be avoided. With proper organization the matter of equipment will follow in natural sequence. It is a problem for

group effort and intensive study. It is not reasonable to expect too much of the physician who sees four cases of cancer per year. This was the ratio found to prevail amongst the physicians of Westchester County, N.Y., by Charlton, chairman of that county's cancer committee, and may be taken as fairly representative.

The diagnosis and treatment of cancer to-day in all of its details is beyond the scope of any one man, no matter how intensive his application. The simplest unit for such work should include the cancer clinician, surgeon, radiologist, or both, combined in one specially trained individual. The pathologist needs to be more than a general pathologist; he should have special training in tumour pathology and if the volume of work warrants it, the full-time tumour-pathologist is a blessing to any cancer clinic. The best of assistance from the pathologist can only be obtained by bringing him as much as possible into direct contact with the actual clinical problems. There is a tendency at times to ignore the internist in the press of matters pertaining to the immediate tumour-picture. The fact that cancer is a disease for the most part of the degenerative period of life should call for the active guidance by the internist at all times in a general medical way, and, if a nice distinction may be made, somewhat apart from the specific cancer problem. When it comes to the point of irradiation therapy, the services of the physicist are indispensable. The detail of physics, geometry and mathematics necessary to the best dosage adjustments is beyond the clinician. It is largely through the cooperative effort of the physicist that irradiation therapy has been placed on a basis of reasonable accuracy.

A great deal of added efficiency, assurance and comfort for the patient is made possible through the development of a specially-trained nursing staff. Too much cannot be said in praise of the experienced, highly-trained cancer nurse. Cancer patients require a great deal of outside visiting, both during the period of active treatment and for follow-up purposes. On this account the work of a cancer clinic will suffer if competent social service aid is not included in the organization.

Many other contributory factors might be briefly mentioned. The unusual importance of accurate, detailed and standardized records can only be appreciated by those who have had the sad experience of trying to review groups of incomplete records. With cancer, the ratio between ambulatory and bed patients is quite different from the average experience in a general hospital. Consequently, a relatively larger out-patient department as compared with hospital beds is essential. The economic factors of hospitalization are worthy of consideration. Should there be two classes of service, one for the active case, the other for the terminal case? It would result in lessened costs and might very well save to a degree the morale of the more favourable case by keeping him from too much contact with the more unhappy phases of the disease.

Whatever the detailed arrangements within a cancer group or clinic may be, the identity of the family physician should be respected and preserved at all times. Both the community and the clinic are dependent upon him for early diagnosis. In many of the long-term palliative cases, the chief professional burden falls upon him. He should not be elbowed aside during the active treatment period. The practical manner of applying this principle of group effort must be governed by the needs of the community—large or small, local or national—which it is to serve.

Recognition of the necessity for such group or institutional cooperation is attested by the number of special institutions being devoted to such work. The first cancer hospitals were established about 1890-1900 and included the London Cancer Hospital, the New York State Institute for the Study of Cancer, the Barnard Free Skin and Cancer Hospital in St. Louis, and the Memorial Hospital in New York. More recently special institutions have been or are being developed in London, Milan, Lisbon, Havana and this country. For guidance in the establishment of cancer centres there are many working models. The American Society for the Control of Cancer and the Cancer Committee of the American College of Surgeons stand ready to aid such work. The first report of the College of Surgeons' Committee was made at the Clinical Congress in Philadelphia, October, 1930, and published in *Surgery, Gynecology and Obstetrics,* February 15, 1931. Reports of

various types of cancer centres were made and on the part of the College a minimum standard for recognition as a cancer unit was established.

It is rather generally accepted that, depending on the local needs and the anticipated scope, the types of organization to be considered are the cancer institute, the cancer hospital, the cancer service in a general hospital, the diagnostic clinic. Whichever it is, organization to include the various specialties and with a specially-trained directing head is essential. Regular and frequent conferences, adequate records, and careful follow-up of patients are imperative.

It may seem that the latter part of this discussion has drifted rather far afield from the subject of irradiation therapy. This has been in an effort to emphasize the necessity for co-operative action — administrative, professional, surgical—in order to make most use of the advantages to be derived through the agency of radiation. Without such co-operative group-effort, radiation stands for little and progress in the fight against cancer will be practically at a standstill.

FLUIDS IN SURGERY

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THE problem of fluids in surgery is an acute one. Surgeons, in general, admit the importance of pre-operative and post-operative fluid, but no satisfactory agreement has been reached as to the kinds to be used, the amounts to be given, or the method by which they should be introduced into the body. In attacking these problems, using facts introduced by competent research investigators and making use of the biochemical knowledge acquired in clinical experience, the authors hope to aid in the clarification of the matter. Since the use of fluids is invariably directed towards maintaining the acid-base balance, electronic concentration and blood volume, some understanding of the nature of these processes and their vital importance to the living organism is essential. The manner in which the various kinds of solutions influence these processes would be the next logical step. This should be followed by a discussion of the amounts of fluid indicated in the more common and important surgical conditions. The final step should be a discussion of the methods by which the various fluids can be given. This outline will be followed as closely as possible.

In order to understand the acid-base balance, electronic concentration and blood volume, we must see the human organism as striving to maintain its existence within very narrow limits of safety. A serious upset of any one of these processes may result in a catastrophe. To resist the various disturbances to which the organism is constantly subjected these processes have formed a defensive alliance. A disturbance in any one is resisted as far as possible by the specific process involved. When this process is unable to further cope with the situation the other two are called upon for aid, until by mutual assistance the biochemical balance is again established. Each contributes its share to the maintenance of the physiological limitations of the organism, but each in its turn has its own limit beyond which it will not give. When this limit is reached the continuation of the disturbing influence results in grave symptoms leading finally to death. The interlocking nature of these processes can best be demonstrated in diabetic acidosis. Here, great quantities of ketone acids are thrown into the blood stream by the incomplete oxidation of fat. The sodium in the blood reacts to form a neutral sodium salt of ketone acid, and carbonic acid. The carbonic acid is excreted through the lungs as carbon dioxide and water. The sodium salt is carried to the kidneys, and ammonia, formed by synthesis from urea, displaces the sodium which is returned to the blood stream to react with carbonic acid. This produces more sodium bicarbonate to replenish the blood bicarbonate. Ketone acid, now combined with ammonia, is excreted through the kidneys as a neutral ammonium salt. So far only the acid-base balance is defending the organism from the production of the abnormal ketone acids. As the production of these ketone acids continues, however, there arrives a time in which ammonia cannot be produced in sufficient quantities to

displace the sodium. As a result of this some of the ketone acids must be excreted as neutral salts of sodium. As sodium is one of the chief electrolytes of the blood this lowers the electrolytic concentration in the blood serum. Water is immediately excreted through the kidneys to restore the electronic concentration to normal, and in doing this the blood volume is reduced. Thus we see that all three processes have served to offset the disturbing influence. This mechanism continues if the patient is untreated, until each process has contributed to its limit. What happens, after this limit is reached is uncertain, but the terminal result is death of the organism[1].

Comparatively little is known about disturbances of the electronic concentration. Rowntree[2,3,4], in his experiments on "water intoxication", using dogs as the experimental animal, has shown that the giving of large amounts of water far beyond the excretory powers of the animal resulted in serious symptoms, leading finally to convulsions and death. These symptoms could not be produced by giving saline in isotonic concentration and could be immediately relieved by the injection of hypertonic saline. It seems reasonable to assume, therefore, that the disturbance is one of electronic concentration. That the blood volume was not directly involved is proved by Smith and Mendel[5]. These investigators forced isotonic saline into the veins of rabbits in quantities equivalent to the animal's blood volume. Within five minutes the fluid had disappeared from the blood stream into the tissue spaces and the body cells, to be eliminated slowly through the kidneys. Other investigators[6] have used even larger quantities of isotonic saline, and noted only that when the tissue spaces and body cells have reached the limit of storage capacity the kidneys are immediately stimulated to excrete the excess fluid. In not a single instance did any of these animals show symptoms of "water intoxication". The dilution of the blood, in the presence of a normal heart and normal kidneys, is exceedingly difficult, experimentally, when isotonic saline solution is used[5,6,7].

The reduction of the blood volume beyond a certain limit is known to be attended by grave symptoms. This reduction may be relative, as in splanchnic dilatation, or actual, as in hæmorrhage, vomiting, acidosis and burns. The reduction of blood volume beyond its physiological limits results in a fall of blood pressure. It has been shown that in the presence of a low blood pressure, vascular permeability is increased with the further loss of fluid, electrolytes, and even of serum protein from the blood stream[8,9,10,11]. The serum protein loss must be taken into consideration in the extreme degrees of shock. It has been proved that reduction of serum protein in normal blood will in itself lead to shock-like symptoms and death of the organism[12]. Furthermore, serum protein, by virtue of its colloidal nature, possesses far greater attraction for water than electrolytes[13]. If serum protein is lost to any considerable extent in severe shock it must be replaced in order that any subsequent fluid given will be held within the blood vessels.

The fluids used in surgery are, chiefly, glucose solution, saline solution, Locke's solution, and blood by transfusion. Taking into consideration the biochemical needs of the organism, glucose solution should have a relatively minor place in the fluid armamentarium. Glucose will prevent the production of ketone acids in starvation, a fact of significance in infants and young children, but of very little importance in the surgical adult[14,15]. The acidosis of starvation rarely becomes of such a degree as to produce symptoms in the adult. Glucose does not ionize rapidly. It does not contain the sodium and chlorine molecules so essential to both acid-base balance and electronic concentration. It furthermore produces a temporary dehydration when given subcutaneously and intraperitoneally[17]. When given to restore blood volume the hyperglycæmia induced is likely to cause glycosuria with further dehydration[17]. Glucose solution should be used, therefore, in small quantities to offset the mild acidosis of starvation in the adult, and in large quantities to counteract the starvation acidosis in young children. When glucose is used, the 5 per cent solution is advisable, as this concentration is isotonic with blood and will not upset the electronic balance. When given intravenously glucose must be administered slowly, to prevent glycosuria and dehydration[17]. When, given subcutaneously an equal quantity of isotonic saline should be used to offset the temporary dehydration induced[16].

In saline we have a solution that will restore very promptly in all surgical conditions the acid-base balance, electronic concentration and the blood volume. The chief base of the blood is sodium; the chief acid is chlorine; the great bulk of the blood volume is water; and the electronic concentration is chiefly maintained by retention, excretion and diffusion of sodium, chlorine and water. Give to the organism a

sufficient quantity of isotonic saline solution and it will by selective action retain sodium and discard chlorine in the presence of an acidosis, retain chlorine and discard sodium in the presence of an alkalosis, and utilize the sodium, chlorine and water to distribute between blood stream, tissue space and body cell, to establish electronic balance and restore blood volume. In order to simultaneously correct all three processes the saline must be isotonic, as saline in any other concentration will affect the electronic concentration and force readjustment of the other two processes.

Locke's solution, containing all the inorganic chemical elements of the blood in physiological amounts, can be used in place of saline solution. It has been claimed that this solution is superior to isotonic saline. This superiority, if it exists, is more than offset by the added danger of the solution not being isotonic. It is obviously more difficult to make Locke's solution, with its numerous chemical components, at a constant physiological concentration than it is to produce simple isotonic saline solution.

Transfusion of whole blood is becoming of more and more importance in the treatment of severe shock, even in the presence of a hæmoconcentration such as is seen in the severe burn case. The rationale of this procedure is to restore the serum protein lost through increased capillary permeability. The serious symptoms resulting from a low serum protein have already been discussed[13]. Blood transfusion is not a procedure to be used only in anæmias but is a very essential part of the treatment of severe degrees of shock.

In attempting to arrive at any conclusion as regards quantities of fluid to be given one is immediately confronted with the wide variations of fluid loss of the normal individual in metabolism, and the still wider variation of fluid loss in the different surgical conditions. The logical amount of fluid to give an individual is the amount he would lose through normal metabolism plus the amount lost as a result of the pathological disturbance. Reviewing the various opinions as to the amount of water and salt excreted by a normal individual over a period of twenty-four hours it is apparent that 1500 c.c. of isotonic saline would adequately cover the ordinary need of the body[18]. Any quantity taken for the base line would be subject to criticism. This amount, however, seems to be about average. The variation of fluid loss in pathological conditions is so marked that it seems logical to discuss each separately, to try to arrive at some conclusion from both clinical and experimental evidence and find some method of indicating, if possible, just how much fluid should be given. The experimental evidence will be discussed in detail, because if experimental evidence is of any value, it is necessary to revise our ideas of the fluid demanded by the organism in surgical conditions.

BURNS

In considering the fluid requirements of the organism in burns two, possibly three, types of shock due to blood volume reduction must be considered. In the work done by Underhill, Kapsinow and Fisk[19] on rabbits, they observed that when the rabbit was anæsthetized there was no evidence of the primary and immediate shock that we see clinically. One would deduce from this that the clinical primary shock is due to pain and fear induced by the injury, and that the physiological effect is a reflex dilatation of the vascular bed with a relative reduction in blood volume only. This shock cannot be ascribed to actual fluid loss or to a real reduction of blood volume, because it occurs immediately and the time interval is too short for much fluid loss to occur. In the same series of experiments Underhill, Kapsinow and Fisk observed that following a burn there was an increase in vascular permeability in one direction with a decrease in vascular permeability in the other direction[20]. In other words fluid was lost from the blood stream in the direction of the intercellular spaces in the burned vicinity in abnormally large amounts, but there was no reabsorption from the spaces to the blood stream to any great degree for twenty-four hours. This fact would seem to indicate that the great fall of blood pressure and symptoms of shock observed in these animals in the first twenty-four hours was due to an actual loss of fluid from the blood stream into the surrounding intercellular spaces. This loss was observed to begin within half an hour of the injury, to become progressively greater for twenty-four hours, to continue at this level another twenty-four hours, and then to be slowly reabsorbed[21]. In a chemical analysis of this fluid Underhill and Fisk found it so similar to blood serum that for all practical purposes it could be considered identical[22]. These investigators estimated the amount of fluid lost by comparing the fluid in the burned area with the fluid of an equal normal area on the opposite

side of the animal. It was found that an amount of fluid was lost in twenty-four hours equivalent to 70 per cent of the blood volume of the animal when approximately 1/6 of the animal's surface was burned[21]. An adult human being weighing 150 pounds would have a blood volume of approximately 5,000 c.c., and would, by analogy, lose 3,500 c.c., of fluid in 24 hours with 1/6 of his body surface burned. As we usually consider a burn involving 1/3 of the body surface to be fatal, an individual burned to this extent would lose fluid equivalent to 140 per cent of the blood volume, or 7,000 c.c., within twenty-four hours. When we consider the burns involving more than 1/3 of the body surface, the loss of fluid would be estimated as between 7,000 c.c., and the 14,000 c.c., which would theoretically be lost when an individual had 2/3 of his body surface burned.

It was also found out by these same investigators that whereas the fluid lost tended to be greater with the degree of the burn, this was not always the case. The organism seemed to have a maximum response to fluid loss beyond which it would not go, and the conclusion arrived at experimentally coincided with what we already know clinically, that the surface area burned is far more important than the degree of the burn[21]. It would seem from these investigations that if there is a shock element due to protein disintegration products it would be unlikely for this to enter into the picture for twenty-four hours as there was no appreciable absorption from the burned area for this period of time[20]. Injections of methylene blue showed no great degree of absorption from the burned area for twenty-four hours and it was impossible to produce convulsions in animals by injecting strychnine solution into the burned area until reabsorption was instituted[20]. There are two more facts of interest in these investigators' work. In the first place, although chloride was present in the fluid of the burned area in the same proportion as in blood serum, there was no alteration of the blood chloride until 36 per cent of the body chloride had been lost[23]. This fact can be accounted for, first, by the chloride withdrawn from the normal cells and cell spaces of the body to compensate for the loss of chloride from the blood stream and, secondly, by the fact that the serum lost from the blood stream was in physiological concentration and would reduce only the blood volume and not the electronic concentration as long as constriction of the vascular bed was able to compensate for the lowering of the blood volume. The second interesting fact was that burns seemed to be able to produce effects and changes in the deep organs which can be ascribed to the direct application of heat on the surface above these parts[19]. Burns produced in the skin of the back over the spinal cord would cause death of the animal within a comparatively short space of time with profound neurological symptoms, whereas if the skin was drawn to one side away from the spinal cord and burned to the same degree the course following this burn would be identical with that of the burn of the same extent in any other portion of the body. It was also observed in burns of the abdominal wall that areas of congestion, œdema and even ulceration leading sometimes to perforation occurred in the intestinal tract. A thermometer placed in the abdominal cavity before these experiments showed a definite rise in local temperature inside the abdominal cavity.

When one considers the treatment of burns in the light of the above facts one is at once struck by the inordinate amount of fluid which the organism seems to demand. Bearing in mind that the primary shock is not due to a loss of actual blood volume but rather to a relative loss through dilatation of the vascular beds and that the secondary form of shock is due to an actual escape of fluid from the blood stream to the surrounding intercellular tissues we can formulate some plan of therapy. We must also keep before us that, choosing arbitrarily a man weighing 150 pounds, his fluid loss theoretically ranges between 3,500 c.c., with 1/6 of his body surface burned, to 14,000 c.c., with 2/3 of his body surface burned. The plan of giving a severely burned man up to 14,000 c.c., of fluid appears to be exceedingly radical, but in considering that most patients with burns involving over 1/3 of the body surface die with the present treatment, it may be well to consider that in such cases 14,000 c.c., of fluid would possibly be rational. As to whether this amount of fluid would be dangerous or not, we have only to turn to Smith and Mendel's experiments already discussed[5].

In considering the treatment of the patient as compared with the data evolved from the research animal, it must be borne in mind that these animals did not receive fluid and that, if their normal blood volume had been restored, still further escape of fluid from the blood stream into the tissues might have followed. It would seem logical to guard against this in clinical

treatment by giving immediately some colloidal solution which would cause retention of water in the blood stream by raising the osmotic pressure. Such a colloidal solution could best be given in the form of a blood transfusion, which by raising the serum protein of the plasm would likewise raise the osmotic tension and cause retention of water. This we believe logical, even in the fact of the hæmo-concentration invariably seen in burned cases. Furthermore, as has been already discussed, the reduction of the serum protein content of the blood stream in itself may play a major part in the death of the patient. Since the primary shock is due to a relative loss of blood volume from vascular dilatation, it is logical that the initial injection of fluid should be intravenous and rapid. This would tend to restore the blood volume and when the vascular bed recovers its tone there would be an excess of fluid present to aid in replacing the fluid now to be lost through increased vascular permeability. Depending upon the area burned, and upon a normal heart and normal kidneys, this intravenous injection can safely be carried up to as much as 5,000 c.c., if we can reason by analogy from the work done by Smith and Mendel[5]. Following recovery from the primary shock and entering upon the period of shock induced by actual loss of fluid into the tissues, isotonic saline should be given in an amount sufficient to keep the blood volume as near normal as possible. Since the loss of fluid varies according to the surface area burned it is unsafe to make a definite statement as to the number of cubic centimetres of water to be given. It would be ar better to use some substance in the blood stream which will give us an index to the blood volume. This is logical since, as we have shown, the disturbance from the blood stream is not that of a variation in the acid-base balance or of the electronic concentration but apparently, in so far as is compatible with life, is entirely of blood volume. As has been shown the chlorides of the blood are not reliable for this purpose[23] and as the direct measure of blood volume is impossible, the use of the hæmoglobin and the red blood cell concentration seems to be the best indicator. It has been proven that under condition of shock the hæmoglobin and red blood cell concentration varies in the different portions of the blood stream and is therefore unreliable as an index of the severity of the shock[24]. But, taking the blood from the same locality each time, the variation of the hæmoglobin and red blood cell concentration is a good index as to the progress of shock, an increasing concentration of the two indicating a progression towards the unfavourable termination and a decreasing concentration, a progression towards the favourable. It is the opinion of the authors that isotonic fluid solution should be forced, no matter to what quantity, until the hæmo-concentration returns to normal and that it should be maintained at this point until the loss of fluid into the subcutaneous tissues ceases. This would involve a calculation of the hæmo-concentration at frequent intervals. As regards the kinds of fluids to be used reasons have already been given why a transfusion of blood is necessary. The other fluid that should be used is isotonic saline solution, since the acid-base balance and the electronic concentration of the blood stream are apparently not disturbed and one is able to restore blood volume with this solution without disturbing these equilibriums. Even if a disturbance of the acid-base balance and the electronic concentration should occur, the selective action of the organism would correct this, providing sufficient saline in isotonic concentration is provided. The use of glucose solution in this condition we believe to be contraindicated. There is no starvation element likely to enter into the picture, and if sufficient glucose were given to cause a hyperglycæmia, glycosuria might be the result and some of the water in the blood stream would have to be utilized to excrete the excess sugar[17]. Glucose solution furthermore would cause temporary dehydration if given subcutaneously[16]. Since the investigations of Underhill, Kapsinow and Fisk[20] showed that no reabsorption took place from the burned areas, to any great degree for 24 hours, it seems reasonable to assume that if any shock due to protein disintegration products enters into the clinical picture of burns it could not do so for 24 hours. If it does play a part after the first 24 hours it would manifest itself by either causing increased permeability of the vascular walls with subsequent loss of fluid into the perivascular spaces and an actual reduction of blood volume, or by a dilatation of the vascular bed with a subsequent relative decrease of blood volume. In any case it would produce changes in the hæmo-concentration and should be treated with isotonic saline injections. Since the increased permeability in the vessels appears to be mainly in the vessels around the deep fascias[19], it would seem that the use of tannic acid would only prevent absorption

to a relatively insignificant degree as its action is only upon the surface. With this in mind it would seem that measures to prevent infection (such as the use of acriflavin solution) would be of far more value than the use of tannic acid to prevent protein absorption.

TRAUMA

In considering the problem of fluid loss following traumatism to various parts of the body one should, in the light of recent research, avoid as far as possible the use of the term "shock". This is necessary because, whereas the more severe grades of traumatism lead to fluid loss sufficient to markedly decrease the blood volume and produce the clinical picture of shock, the traumatism involved in the greater majority of cases is sufficient only to cause the loss of fluid in milder degrees. It is in the various gradations of fluid loss leading up to shock symptomatology that we are chiefly interested. It is a matter of profound concern to the surgeon to know why, in operations upon certain areas of the body, shock is not an infrequent phenomenon and why operations in other areas are rarely if ever attended by this phenomenon; then again, why operating in certain areas will sometimes cause shock while the same operation in the same area at other times will not be attended by any untoward symptoms. The understanding of this seemingly paradoxical state of affairs lies in the study of the changes produced leading up to the phenomenon of clinical shock.

Again in considering traumatism to body tissues, recent research forces us to accept two and possibly three types of shock. Blalock[25,26], investigating the nature of shock following traumatism, found no evidence of the immediate primary shock in animals anæsthetized to pain insensibility. Since this primary immediate shock is a clinical fact we are again forced to reason that it is due to reflex vascular dilatation with a relative deficiency in the blood volume. The onset is too rapid to be caused by actual fluid loss. This also bears out the finding of the British War Commission[27] and of Wallace, Frazier and Drummond[28] who observed no evidence of splanchnic dilatation on patients operated upon in all degrees of shock. It is reasonable to assume that these operations were performed on patients in whom the first primary shock had disappeared and been replaced by the second type of shock due directly to fluid loss. In a series of brilliant experiments Blalock has measured the fluid loss resulting from traumatization and has found (Cannon and Bayliss[29] notwithstanding) not only sufficient escape of fluid from the blood stream to account for the lowering of blood pressure but that the reduction of blood pressure kept parallel with the loss of fluid[25]. The analysis of the escaped fluid here also showed its similarity to blood serum[30]. In his first series of investigations, Blalock, by traumatizing the extremities of a series of dogs, calculated the loss of fluid by comparison of the weight of the traumatized side excised at the level of the umbilicus with that of the non-traumatized side excised at the same level. He concluded that an increased vascular permeability permitting the escape of fluid into the surrounding intercellular spaces is the reason for the fall of blood pressure observed[25]. Blalock found a marked amount of fluid diffused into the region of the groin and peripelvic tissues and concludes that the reason Cannon and Bayliss[29] failed to find as great a loss of fluid was because their comparisons were made upon limbs excised below this level. By far the most interesting observations made by Blalock were upon traumatism to intestines[26]. In anæsthetized dogs shock was produced by pinching between the gloved fingers loops of intestine for varying lengths of time. It was found that an increased vascular permeability was induced and that sufficient fluid was lost into the intestinal wall and into the peritoneal cavity to account for the marked lowering of blood pressure observed and that, here too, the lowering of the blood pressure kept parallel to the loss of fluid. These same phenomena were induced by gentle traction on the mesentery. In no instance, with his deeply anæsthetized animals, did he observe splanchnic congestion. The fluid lost by both types of peritoneal trauma was analyzed and was again found similar to blood serum[30]. The loss of fluid necessary to lower the blood pressure to 70 mm. of mercury or lower in trauma to extremities was found to be equal to about 3 per cent of the animal's body weight; in traumatism to intestines to about 4 per cent of the body weight. In converting this to calculations for a man weighing 150 pounds, we use the figures of Meek and Gasser[31], who found in a large series of dogs that their blood volume averaged 9.7 per cent of the body weight. Taking an average of Blalock's figures of 3.5 per cent, the dogs then lost fluid equivalent to approximately 36 per cent of their blood volume. A man weighing 150 pounds, with an estimated

blood volume of 5,000 c.c., would, by the same calculations lose fluid equivalent to approximately 36 per cent of his blood volume, or 1,800 c.c. This loss would theoretically be sufficient to cause a marked lowering of blood pressure and symptoms of shock. One is immediately impressed with the difference in loss of fluids in this type of injury and in burns. It must be remembered that Blalock carried his investigations only far enough to produce a blood pressure of 70 mm. of mercury and then terminated the experiment. This took only a matter of a few hours. Using the same experimental technique, this investigator in computing fluid lost in burns necessary to produce a low blood pressure found that it was only necessary to lose 3.34 per cent of fluid by comparison to body weight, or, by analogy in the 150 pound man, approximately 1,800 c.c.[32]. It seems reasonable to suppose that should this experiment have been carried on for 24 hours instead of just the time necessary to produce a low blood pressure that his figures would have approached those of Underhill. Taking everything into consideration, Blalock's experiments show a remarkable consistency in the amount of fluid loss from the blood stream necessary to produce a marked lowering of the blood pressure. One does not necessarily infer from this that any such inordinate amount of fluid is lost in traumatic shock as in burns. If the injury was such as to cause cell death over the same surface area it is possible that the fluid lost in the two conditions would approach the same quantity. In traumatism, certainly as regards intestinal traumatism at any rate, the injury approaches more nearly a tissue "insult" than actual cell destruction. In the severe traumatic injuries of the extremities, whereas cell death is a factor, the surface involved rarely approaches that of a severe burn to 1/3 of the body surface. There is a factor, however, that possibly might cause a greater loss of fluid than Blalock found in traumatic injury. It is to be recalled that one of the peculiarities of shock is, that when the blood pressure reaches a certain low level, the blood vessels will further deepen shock and reduce blood volume by not only giving up fluid and electrolyte to the tissue spaces but also serum protein[8,9]. In other words low blood pressures seem also to make the vessel walls more permeable. It is therefore conceivable that if the initial fall of blood pressure caused by the loss of fluid from the blood stream is not corrected the fluid loss may be accentuated by the low blood pressure, and a greater amount of fluid may be lost than Blalock's experiments indicate.

The treatment of this condition seems to be indicated from the foregoing facts. First and primarily this loss of fluid must be prevented by gentle handling of tissues. The primary immediate shock that we do observe clinically on the operating table must be due, in spite of research observation, to vaso-dilatation. It is possible that it only occurs when the anæsthesia is not sufficiently deep to prevent reflex action. This type of shock can especially be prevented by the regard for tissues that Halstead advocated as so essential. The authors do not believe that in patients with normal blood volume the pre-operative forcing of fluids is of great benefit unless given just prior to the operation. It is reasonable to assume from experimental evidence that this excess of fluid will not be retained but will be excreted to restore fluid balance and the surgeon will be deluded into believing his patient is carrying extra fluid to compensate for that loss during and after an operation[5,6]. This statement is not to be misunderstood however. In those cases in which the disease is such that dehydration is a feature the pre-operative giving of fluids is not only beneficial but essential. There is no surgical condition more dangerous to the patient than dehydration, and all other procedures must be held in abeyance until this factor is corrected. Also, since it has been shown that excess fluid is first taken into the tissue space and cells to be excreted slowly through the kidneys, fluids given subcutaneously and intravenously in large amounts half to one hour before the operation will be present for use when the need arises[5,6]. It seems, however, since fluid is lost slowly during and after operations, more logical to place fluid beneath the tissues immediately following the operation and permit the body to draw upon it as its needs arise. The shock immediately attendant upon the operation is believed to be the result of vaso-dilatation with subsequent relative loss of blood volume and the use of fluids intravenously and rapidly is advocated. The fluid used in traumatic shock should be insotonic saline as the restoration of the blood volume without alteration of the electronic concentrations and the acid-base balance is desirable. Glucose solution, here too, may, if given in sufficient quantities to cause hyperglycæmia, result in glycosuria and still further loss of fluid[17]. Blood transfusion should be used

if the blood pressure falls very low and shock is particularly profound. Here as in other forms of shock, this procedure will increase the serum protein and aid in the retention of water by the blood stream. The amount of saline necessary to prevent the fall of blood pressure should be calculated from the estimated loss of fluid from a moderate degree of traumatism, which will range on the average around 1,800 c.c. plus the fluid lost through perspiration during the anæsthesia and the amount of saline solution necessary to metabolism for the next twenty-four hours. This would give an estimate of about 3,500 c.c. to 4,000 c.c. From this work it would seem that all surgical procedures would involve fluid loss in greater or lesser quantities, varying from the small amount lost through perspiration and soft tissue "insult" in the simple hernias to the larger amounts lost from the handling of intestines. The amount of fluid lost may not be sufficient to cause a fall of blood pressure, because, as already has been brought out, the organism possesses a relatively wide margin of safety through its endogenous adjustments. Dehydration, however, does occur following every major surgical procedure by the same combination of fluid lost through traumatism and the sweating attendant upon the anæsthesia. This was proved by Andrews and Reuterkiold, who in the average post-operative surgical patients not receiving post-operative fluids found, by using the Aldrich-McClure intradermal salt test, a constant and marked increase in tissue thirst[33]. It is therefore essential to understand that every major surgical patient should have post-operative isotonic saline to the amount given above. The majority will recover without the aid of the surgeon because of the wide margin of safety possessed by the organism. The surgeon, however, who continually permits the loss of this margin of safety will frequently find himself in trouble when some complication sets in.

The third variety of shock is that caused by protein disintegration products. Concerning this type of shock investigators are becoming more and more dubious. That it is not essential to the second type of shock just discussed is proven by the fact that the loss of fluid from the blood stream in the amounts given is capable by itself of causing all the attendant phenomena. If this third variety of shock is a clinical actuality the restoration of the blood volume by isotonic saline and blood transfusion is indicated as in other varieties.

VOMITING

In considering the biochemical changes induced by vomiting one must take several factors into consideration. First, in prolonged vomiting there is a tendency towards the production of a starvation acidosis. Secondly, there is a loss of chloride, sodium and water in the vomiting with a tendency toward the production of alkalosis and dehydration. The ultimate result of the biochemical upset will depend upon whether the starvation element outweighs the loss of chloride[34,35]. In an adult, starvation acidosis rarely, if ever, becomes a serious factor. When the glycogen content of the body has been burned protein will furnish glucose to such an extent that, whereas it will not offset entirely the production of ketone acids from deficient oxidation of fat, it will so reduce the production of these acids that one rarely sees symptoms of acidosis[15]. It must be remembered, however, that this starvation element with the production of ketone acids is always present in a mild degree in prolonged vomiting and as a consequence acetone and diacetic acid will be found in the urine of these patients, even in the presence of a severe alkalosis[36]. In children, however, glycogen dissipation is very rapid and the starvation ketosis far outweighs the loss of chloride. Acidosis, consequently, is the result[16]. In the adult, vomiting produces a loss of chloride, sodium and water, and the quantity of chloride lost is far in excess of the sodium. For this reason alkalosis is usually produced[37]. The loss of sodium, however, must be taken into consideration in the treatment of these cases as the introduction of chlorine in combination with elements other than sodium will not offset the condition[38]. The loss of sodium causes an actual diminution of the total base content of the blood and in the treatment of prolonged vomiting in the adult, fluid should be given containing both sodium and chlorine. This fluid should be isotonic saline solution. Glucose solution may be used in small quantities to prevent the mild degree of starvation ketosis which may occur in these cases. In a young child, however, where starvation ketosis plays a major part, glucose solution should likewise play a major part, but not to the neglect of the sodium and chlorine deficit.

It has been proven that the fatal results so often seen in high intestinal obstruction is due entirely to the loss of water, sodium and chlorine from the blood stream[34,39,40]. If one ligates the

upper duodenum in a rabbit (this animal is chosen because it is unable to vomit), collects the secretion in the stomach produced as the result of the obstruction, and injects back into the blood stream an equal quantity of isotonic saline solution, the rabbit may be kept alive until it dies from starvation. Likewise if one removes these stomach contents and then relieves the obstruction the animal will die, whereas, if one removes the obstruction and does not remove the stomach contents, reabsorption takes place and the animal survives. It is, therefore, evident that in obstruction in the upper intestinal tract emergency operation is not justified. The patient should be treated first for his alkalosis and dehydration and the obstruction relieved only after the patient is in biochemical balance. It is interesting to note that in the obstruction due to carcinoma of the pylorus with achlorhydria the alkalosis is usually very mild and the patient suffers chiefly from dehydration[41].

In comparing biochemical changes in obstruction of various portions of the intestinal tract one must take into consideration its embryology and physiology[42]. The stomach and duodenum are derived from the foregut, drain into the portal circulation, and their functions are chiefly secretory. One therefore finds, in obstructions in this locality, a disturbance of the biochemical balance in the blood stream. The jejunum and ileum are derived from the midgut, drain into the portal circulation and their function is chiefly absorptive. One observes, therefore, in obstructions of the lower jejunum and ileum, a toxic absorption not found in high or low obstruction with a minimum disturbance of the biochemical balance of the blood[35]. Isotonic saline in obstruction of the lower jejunum and ileum will prolong the patient's life but will not have any effect on the final outcome of the case[42]. For this reason obstruction of the small gut in its lower portions should be relieved as soon as possible. The large bowel is derived from the hindgut, drains into the portal circulation, and its function is chiefly excretory. In obstructions of the lower colon one does not find a marked disturbance of the biochemical balance or any great degree of toxic absorption[42].

It is, therefore, obvious that in upper intestinal obstruction isotonic saline should be used and the amount should be indicated by measuring the amount of fluid lost by vomiting. In children, the solution used should be equal quantities of 5 per cent glucose and isotonic saline. The operative relief of the high obstruction plays a secondary rôle. In the small bowel obstruction in the lower jejunum and ileum fluids in large quantities are not indicated unless severe vomiting is a feature. The main concern in these cases is the operative relief of the obstruction to eliminate toxic absorption. In lower bowel obstructions the importance of both fluid and of immediate operative relief is not quite so acute as in obstruction elsewhere. The return of the bicarbonate content of the blood to normal will in all three types of obstruction indicate the presence of sufficient fluid[43]. In locating these obstructions it must be remembered that the experimental extremes have been chosen and that an obstruction in the upper jejunum will give the features of both a high obstruction and of a small gut obstruction, whereas, an obstruction located in the ascending colon will give a combination of the features of a low obstruction and a small gut obstruction. In speaking of "toxicity" from the small gut obstruction the authors wish to admit that, whereas this toxicity appears to be a clinical fact, it is experimentally not proven.

OBSTRUCTIONS OF THE COMMON DUCT

It is a surgical dictum that if one drains the gall bladder in the presence of an obstruction of the common duct due to a carcinoma of the head of the pancreas the patient will die within 48 hours. The reason for this was not suspected until Walters, Green and Fredrickson studied the bile lost through common duct drainage[44,45]. In draining the common duct with a stone in the ampulla of Vater these investigators found that in 24 hours the patient lost between 500 to 700 c.c. of bile. When carcinoma of the head of the pancreas is the cause of the obstruction, drainage of the common duct resulted in the loss of between 1,300 to 1,800 c.c. of bile per day. Furthermore, the bile drainage from the duct in carcinoma of the head of the pancreas contains ten times as much sodium chloride as compared with that lost as the result of a stone in the common duct. The explanation has been offered that in the case of a stone in the common duct, infection followed by fibrosis of the biliary radicles is a factor and does not permit dilatation of these radicles to the same extent as that observed in a carcinoma of the head of the pancreas, which is not usually accompanied by infection. The difference in the absorptive surface is supposed to account for the difference in the amount of drainage[45]. Since blood serum

and hepatic bile resemble each other closely in their composition with the exception that in bile, the biliary salts are substituted for the serum protein, the importance of this loss can readily be seen[46]. Isotonic saline solution in these cases should certainly be given in amounts of 2,000 c.c., above the daily needs of the body.

DUODENAL FISTULÆ

In duodenal fistulæ the loss of upper intestinal secretions is analogous to that seen in vomiting from high obstruction, except that sodium is lost in far greater amounts than chlorine. Therefore one meets with a disturbance of the acid-base equilibrium resulting in acidosis instead of alkalosis combined with a disturbance of the electrolytic concentration and blood volume.[47] It is obvious that the restoration of the biochemical balance is necessary as well as the local treatment of the condition. The amount of fluid to be given here should be gauged by the bicarbonate of the blood and isotonic saline should be forced until the alkali reserve returns to normal. Furthermore, it is necessary to deprive these patients of food over a long period of time and glucose solution should also be given in order to spare the body protein and prevent tissue waste.

METHODS

The methods by which fluid can be given are four. The first, by mouth, has only a limited use in surgery, since in the majority of cases the patient is unable to take fluid in this manner for one reason or another. The second method, by proctoclysis, is limited only to saline solution, since it has been definitely proven that glucose will not be absorbed by the bowel to any appreciable extent[48]. Furthermore, if proctoclysis is to be employed it should always be preceded by a cleansing enema and should be given by the technique advocated by Murphy. The technique of giving a successful proctoclysis is important. The container should always be at body level in order that no distention of the lower bowel will occur with consequent expulsion of the fluid. Experience with the Murphy drip has shown it not to be as successful as the original Murphy technique for giving fluid by the bowel. The third method, hypodermoclysis, is the procedure of choice. The rapidity of absorption from beneath the skin will depend upon the degree of dehydration and the absorptive surface with which the fluid comes in contact. The insertion of the needle into the subcutaneous tissues of the thigh in the region of the saphenous vein is the ideal location. This area is rich in lymphatics and any tenderness resulting from the infusion will not restrict the respiratory movements as it would in the chest. This restriction of the respiratory movements tends to promote atelectasis and post-operative pneumonia and is to be avoided if possible. If the solution is given under gravity pressure and the tissues gently massaged to disseminate the fluid over a wide area large amounts can be given very rapidly. Any discomfort attendant upon the infusion can be alleviated by putting into the solution 15 c.c. of 1 per cent novocaine without adrenalin for every 1,000 c.c. of the saline. The fourth method, by the intravenous route, is one which we believe should only be used in an emergency where fluids are needed rapidly and in great quantities. Unless one has an exact knowledge of the condition of the heart and kidneys this method is fraught with danger. For ordinary purposes the placing of fluid under the skin, permitting the body to draw upon it as its needs arise, seems to be far more logical than the sudden or continuous injection of fluid into the veins.

SUMMARY

The relation of fluids to the acid-base balance, electronic concentration and blood volume have been discussed. An attempt has been made to compute the quantity of fluid to be used in various surgical conditions and to evaluate the methods by which fluid may be given.

The conclusions arrived at in this paper are, admittedly, subject to criticism. In reasoning from experimental facts to clinical conclusions wide departures from scientific exactitude were necessary. It is to be hoped that in the near future clinical and experimental facts will be produced to place this subject upon a more solid foundation.

Note: An extensive bibliography (as shown by the numbers in the text) has been prepared to accompany this article, and may be had on application to the authors.

THE SEQUENCE OF EVENTS IN SOME CASES OF HEADACHE*

BY NORMAN B. GWYN

Toronto

CHRONIC headaches, whether of the persistent or paroxysmal type, usually come to rest in the hands of someone many removes from him who has first been consulted. The sequence of events is often such that the last observer is the one who has the good fortune to first find some outspoken sign which bears upon the disability, or to see exposed at operation or at autopsy that condition which had contributed most to a misery of many years' standing.

It is hardly necessary to say that a common sequence of events in connection with paroxysmal headaches is their complete disappearance, even after a continuous existence of many years. Very often, moreover, we recognize that this disappearance coincides with marriage, with pregnancy, with menopause, with cessation of some uncertainty, with gratified ambition, or even with abandonment of life's fondest hopes. On the other hand, we are equally aware of the fact that when chronic and continuous headaches are concerned a transition from bad to worse, and the final demonstration of brain tumour, kidney disease, or cerebro-spinal syphilis, has been too often the course followed. This is an old view and is still true to-day, although now our more intensive methods of examination allow us earlier to detect the chronic Bright's disease or the cerebro-spinal syphilis, and from time to time to determine that this or that case of cephalgia depends upon a food allergy, a hyperchlorhydria, a hypoglycæmia, a blood pressure too high or too low, gout, unsuspected leukæmia, an anæmia, or perhaps a low grade blood infection. One is not forgetful of the fact that oxycephaly, cranial deformities, eyes, sinuses, mastoids, impacted teeth, have all been found in the position of undetected criminals when a search for cause of headache has been instituted, and we would be woefully ignorant if we did not realize that many, many headaches have disappeared only when the feet and neck have been properly twisted, when the stomach, colon and duodenum have been thoroughly dieted and sprayed, the verumontanum or the cervix scraped, the prostate and vesiculæ seminales massaged, the gall-bladder, appendix, tubes, ovaries ravished from their peaceful beds. Yet, too often, in spite of a lucky strike in this or that direction, we have to recognize that the headache has not been relieved, the causes of it have not been accurately determined, and that the sequence of events is going to be most unsatisfactory.

Whether the headache be of the chronic and persistent type or of the paroxysmal type, it has the unhappy faculty of showing us from time to time, particularly when we have made up our minds that a neurotic basis explains all symptoms, that there has been some underlying undetected physical condition which has contributed materially to the make-up of the picture. The eventual solution of some of these problems, occurring only after the course of many years, may read at times like a long drawn-out story, and for this reason one may speak of the sequence of events in some cases of headache.

The sequence of events in one case of fifteen years' standing will illustrate the truth of the statement made in a preceding paragraph as to the frequency with which brain tumour, kidney disease or cerebro-spinal syphilis closes a chapter of headache. This case was one of chronic persistent headache, mostly occipital, at times frontal, never incapacitating. Symptoms apparently began with a sunstroke, but after some years of observation it seemed that a progressive arterial sclerosis or a cerebro-spinal syphilis was to be suspected as the agent in producing the steady ache. A two-plus Wassermann reaction had been found in the blood, the peripheral arteries were much thickened, and there was a very distinct pallor. Every available form of examination which might bear upon the persistent symptom of headache was carried through with the exception of ventriculography, which was not available for the early part of the patient's illness, while in later years the man had disappeared from observation[1]. Not till fifteen

*Read before the Section of Medicine, Academy of Medicine, Toronto, December 8, 1931.

1. I am indebted to Dr. Baillie, of Christie Street Hospital, for the excellent and complete notes on this case.

years had elapsed did any sequence of events take place to disturb one in the idea that the patient had become more or less a chronic complainer. The classical symptoms of brain tumour were lacking. The man had kept at work and did not seem in the early years to be suffering from his headache. He had returned for observation, and the condition of teeth and sinuses was being well checked over: chronic trouble was found in the antrum and there were now many badly infected teeth. During the week in which the teeth were being pulled and the antra punctured and washed out, he developed a slight twitching of the left face followed in a few days by distinct paralysis, first of the face[2], then of the whole left side, and in shockingly quick succession there followed, convulsions, coma and death. The spinal fluid findings had been indecisive (globulin and Pandy plus, cell count five). Interesting suggestions naturally surged forward when paralysis was seen to follow extraction of the teeth and antrum puncture. Abscess, meningeal complications, encephalitis, thrombosis were given preference. The autopsy showed a large degenerating and calcifying spongioblastoma of the right frontal lobe. The march of events from the time of pulling the teeth to the fatal issue was too rapid, and perhaps too stormy, to allow ventriculography, *but the autopsy findings speak strongly in favour of this method of examination, even if for so many years the more serious symptoms of brain tumour were not in evidence.*

Such a case may serve to illustrate the sequence of events in many of the more chronic persistent headaches. Nor is the picture an unusual one. There are, however, recurring and paroxysmal types of headache which call for investigations just as searching as do the more chronic persistent types, for the sequence of events in many of them is at times instructive to a degree, and if properly viewed will go far towards making us question whether in many instances the migraine, the bilious headache, or the "sick head" is a disease *sui generis*. It is not the purpose of this paper to put forth views which shall question the existence of migraine as such; the disorder has been well described and seems to have a symptomatology of its own. The gastric, ocular, and nervous associations are familiar to us all. Its hereditary nature has frequently been dwelt upon. Sound sense however has been lacking in the interpretation of too many of the cases of recurring headache, *and when one sees it stated in a well known system of medicine that the age incidence of migraine ranges from two to sixty years, one wonders how the clinician got from the precocious infant reliable evidence of the existence of the nervous and ocular phenomena which are said to be such an important part of the disorder.* It should be remembered further in this connection that, as has been said of the gouty diatheses, "A man more often inherits his father's cellar than his father's gout," and a child may inherit the inclination to those habits which lead to headache rather than the tendency to the bodily dysfunction itself and it should not be hard to realize that children whose parents lead a life of busy delirium must have a shocking education in that most vital part of their upbringing, the proper control of their emotions.

These are the days of glittering generalities and big headlines. Let me say, by way of conforming to the condition of the times, that the social and economic progress of Upper Canada since 1837 depends as it were upon a paroxysmal headache, a migraine of most malignant type. To be more accurate, our constitution was evolved during the short periods between attacks in which Lord Durham was free from his paralyzing head pains. The headaches of Lord Durham, who had so much to do with the settlement of our affairs after the rebellion are historic, so also was the violence of his temper, his intemperance in his manner of work and his extravagant expenditure of energy—a combination enough in itself perhaps to explain his life of suffering. Most noteworthy, however, in his active life, is the clinical history of his household and himself. His wife died young of tuberculosis; three children died of the same disease as the years went on, and Durham himself was carried off by pulmonary disease in his forty-third year. The sequence of events here can surely only be, early infection with tuberculosis, a chronic toxæmia allowing an easy exhaustion, which as a result of his habits would be readily magnified into the headache of paroxysmal type. To assume hereditary influence or metabolic upsets in the face of such a history is to blind oneself to the obvious.

A similar sequence of events without such tragic endings I have recorded in three of my most typical cases of migraine. All were women who, as girls, were the life of any performance

2. Facial palsy subsequent to the extraction of teeth has been dwelt upon by Spiller in a recent communication. The exact relationship is obscure.

they took part in; all gave the history that after such participations came the undue necessity of rest for the almost inevitable headache. All were of that ambitious nature which compelled them to take upon themselves one responsibility after another. The early details of their life, the recollection of pulmonary hæmorrhage early in life, the spending of weeks in bed with what had been called "nervous exhaustion", the finding finally of a low grade fever, the determination of the existence of a minimal or healed tuberculosis were again in these cases a sequence of events which would seem to indicate that habits, inheritances, exhaustion, plus a long low grade tuberculous infection may paint strikingly the classical picture of the migraine.

One in particular, of these cases of paroxysmal headache, one of 25 years' duration, merits special mention because the victim had the ocular phenomena preceding the headache to a very marked degree. A blurring of the vision, with a large yellow patch, was the most common ocular manifestation, but on many occasions light reactions which she called "cathedral window" patterns, would be present. Yet in spite of symptoms such as these, which are so often looked upon as indications of central nervous disorder, this patient was more distinctly one whose headaches were related to infection, to bad surroundings, and to exhaustion. Her mother had tuberculosis and showed symptoms early in life. The patient had a hæmorrhage from the lungs at about her eighth year. The family life was wrecked at this time by the divorce of her parents, and she began a drab existence in the home of two unmarried relations. The headaches began in her ninth year and were associated at first with much abdominal pain. The ocular symptoms developed later. She broke down in college and for ten years, in spite of rigid abstinence from meat, three and four enemas a day, and removal of the gall-bladder and appendix, she was absolutely incapacitated each month just prior to her periods by blinding headache. The development of a hemi-anæsthesia shortly after first seeing her made one wonder whether hysteria might not be a sufficient explanation of all symptoms. However, the detection of a low persistent fever aroused suspicion, particularly when looked at in connection with her family and past history. An old fibroid tuberculosis of the left apex was revealed by x-ray. The headache subsided with the fever in a matter of three months. Certain perversions of diet and hysterical tendencies had to be dealt with. Finally as if to prove conclusively that a physical fault had been contributing to a quarter of a century of headache, there occurred while mountain climbing, a severe pulmonary hæmorrhage which was followed by outspoken signs of tuberculosis, and though at present she is working and in fair shape, she is compelled to keep her left lung collapsed.

No less interesting to follow was the sequence of events in connection with a paroxysmal headache which afflicted a keen employee in the government service. Her early life showed much the same intensive interest in activities as has been just referred to in connection with the three previous cases. In addition to her day's work, two to three hours' piano practice had been kept up for years. There was a distinct history of rheumatism in her early life at about the time her periods commenced, and when the headaches were well developed they seemed at times to coincide with the menstrual period. This was by no means, however, the fixed rule as time went on. At her first examination some degree of fever was found; this showed no tendency to subside, nor can one say how long it may have existed. There were but questionable signs in the heart. Two months' rest removed the fever, and while at rest the migraine of years standing disappeared. A year's observation, however, shows that an out-spoken mitral lesion has now developed. In spite of this, however, the rearrangement of her life's activities has been followed by practical cure. Habits, rash expenditure of energy, persistent low grade rheumatic infection is the story to be read here. The value of the thermometer was never better shown.

Examples of this sort can be multiplied, cases in which migraine and paroxysmal headache express the association of bad inheritance and bad habits with chronic ailment of almost every known form. Other conditions, characterized by slow development and late appearance of physical signs, which were looked on as indicating that some real disorder was an active factor in the complex of paroxysmal headache, were Banti's disease and some of the chronic anæmias, causes of which were obscure. Time will not permit us to detail more of these cases, but perhaps the course followed by the case of brain tumour, and the interesting association of paroxysmal headache with the physical disorders above detailed will make one realize that in the history of chronic headache the lapse of years so often necessary for its explanation may comprise a clinical history which furnishes an interesting sequence of events.

THE CLASSIFICATION OF MENTAL DISEASES*

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THIS matter of the classification of mental disorders is one which does not immediately lend itself to interesting contemplation. Looked at with the unaided eye the picture is dull, dusty and unrelieved. Put it in a stereoscope, however, and the scene changes. The stereoscope which I would like to put it in is one which does not only bring out the three spacial dimensions, but also the fourth dimension, that of time. Now we can see our classification, not as something fixed and rather dead in a textbook but as an actual battleground with the great dominant currents of human thought swaying theory and action now in this direction and now in that. We can see concepts thrown up out of this strife, expand and meet their destruction against some new fact.

It would be profitable at this point to stop and look at some of the contestants in this struggle, for they are all but immortal. First, there come for attention those two great rivals the seed and the soil theories. The first claims that there is one cause for every disorder, mental or physical. Bring that cause into contact with the human organism and you will produce an unvarying effect, namely, the specific disorder. This theory of the causation of disorder has received a great impetus from the study of bacteriology. This impetus was imparted to the study of mental disorders, both because of its success in general medicine and because the men who were later to work in psychiatry had their minds bent in the direction of this theory during their training days.

With this rise on the part of its rival the soil theory, which had enjoyed robust health for centuries, went into a decline from which it is now being slowly nursed back to vigour. Its contentions are much opposed to those of the seed theory, for it holds that it is the way in which the organism is predisposed that is the important factor, and that the external noxious stimulus is of much less account, and can rarely be regarded as specific. You recognize the operations of this theory in the concepts of the tuberculous or gouty diathesis.

A second great conflict to be seen through our stereoscope is one which carries us back to the religion of the Middle Ages, when a great cleft was made between the mind and the body, and the mind was held to be practically synonymous with the soul, which was immortal and inviolable. Therefore, the mind could not become disordered. What we now call mental disorders were ascribed by monkish reasoning to disorders of the body which prevented the mind exercising its normal control. Since then things have changed, and it is held by many that the mind can be disordered. In other words, we see here the great controversy regarding the organic and the psychogenic origin of mental disorders.

Having gained some perspective let us now turn to our disease concepts as they stand at the present time. Let us take the two great psychoses which contribute most heavily to our hospital population—the manic-depressive, and the schizophrenic, or dementia præcox, disorders. Both of them are believed by the majority to be psychogenic, that is, to arise as the results of mental strain, conflicts, or bad habits of thinking. The first, the manic-depressive reaction, has undergone rapid evolutiou. Its. two components, the excitement and the depression, have been recognized since the time of the Greeks, but at the end of the last century it was seen that people who were subject to periods of excitement were also frequently the subject of periods of depression. Hence the double-barrelled name. Shortly after this, the soil theory, which I have just mentioned, rose into favour, and it was noted that people who were open-hearted, spontaneous, and rather extravagant in their moods, would, if they broke down, show as a rule a manic-depressive reaction. Later, the soil theory went still further, and it was shown that people of a certain physical make-up were specially likely to reveal this reaction if they broke down. The type of physical make-up is roughly that of a person who may be liable to high blood pressure in later life.

Let us now examine the depressive phase of this reaction, and first of all allow the patient himself to report on his condition. He may

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come saying that some weeks or months back he began to suffer from sleeplessness, he could not concentrate on his job, details would worry, and he took his business home with him at night. Later, he began to feel discouraged in the morning and had little confidence. Usually this wore off in the evening and he felt more or less himself again. Gradually, however, he felt himself slipping more and more, and grew rather panicky. He grew constipated and had no appetite. Finally, he felt so unhappy and hopeless about his future that he had to come to the doctor, already with ideas of suicide floating in the back of his mind.

You find him undernourished, constipated, and with cold, moist, rather bluish extremities. You are struck by his slowness in gait and utterance. If you were to examine his gastric contents you would probably find that his gastric secretion is reduced. Hearing his statements of suicide you wisely decide to send him to hospital. There his future depends largely upon his past. If he has been of a sound personality beforehand, and if the situation which has upset him is not insoluble, we can hope that his recovery may be only a matter of a few months. If our patient should be in the involutional years we would expect him to show more anxious unhappiness and restlessness, and to recover after a rather long illness—two to three years. In either types there may be delusions of persecution. When, during the involutional period, the patient's delusions grow more grotesque, and coincidentally his feeling of sadness grows less; when he becomes whiningly oppressed by delusions, particularly in regard to his bodily functioning, we may feel the outlook to be poor. These above-mentioned pure depressions must be differentiated from depressions occurring on organic or toxic bases, *e.g.*, the depression occurring on the basis of arteriosclerosis or of cocainism. At times it is difficult to differentiate depressions with ideas of persecution from schizophrenic reactions with a depressive tinge. This can usually be done, however, by means of the previous personality and by the type of development. In the case of a pure depression the feeling of sadness is the first to appear, delusions coming on later, while in schizophrenia the reverse may be the case.

The opposite side of the picture is where the patient is brought to you very cheerful, talking a great deal, and with very big ideas. I say "brought" advisedly, for unlike the depressions, the excitements or manics rarely have any insight into their condition. Here, paradoxically enough, the less ill they are the worse it is. With the obviously excited person there can be no doubt that he should be under care. But any family is in a most unhappy state when one of its members passes into that mild state of excitement known as hypomania. Here there is a mild excitement, mild over-activity, and, because of the rosy glow in which things are viewed, a most serious loss of judgment, so that the patients may plunge their fortunes into ruin in the course of a few months.

With regard to the prognosis one would say that the attacks usually have a favourable termination in a matter of months. One must not, however, lose sight of the fact that there may be a fatality due to suicide in the depressions, or exhaustion in the excitements. With the advance of years, in fact from about the thirtieth year, depressions increase in relative frequency, and apprehensiveness and anxiety colour the picture more and more deeply. In the majority of manic-depressive cases the attacks grow less frequent with years, but in some where the personality beforehand has been unsatisfactory the patient may grow "stuck" as it were in an attack and never fully emerge.

The manic attacks have in their turn also to be differentiated from excitement occurring on an organic basis. In particular one must differentiate off the manic general paretic. It is to be remembered in this connection that there are cases in which the serological or neurological findings are minimal. It is exceedingly rare, however, to find cases in which both are small. Excitements on the basis of intoxication readily occur, and the proper diagnosis will influence the treatment considerably. It is again to be emphasized that hypomanic states urgently require hospitalization if this can be attained.

The concept of dementia præcox, or schizophrenia, arose at about the same time as that of the manic-depressive reaction, and, indeed, was originated by the same psychiatrist, Kraepelin. It was noted that while some types of mental disorder tended to recover and recur, *i.e.*, the manic-depressive reaction, others tended from the outset to slide into a dementia. Those cases which had become demented were traced back and their symptoms collected and grouped into the concept which we now know as dementia præcox. The adjective "præcox" was added since it was found that the symptoms of these cases for the most part commenced in adolescence. Time has shown that this concept was based

upon an error in logic. The symptoms do not necessarily commence in adolescence and dementia is not inevitable. In this psychosis too the soil theory has substantiated claims. It is recognized that a special type of personality is more prone to this disorder. This type of personality shows very large variations and includes such persons as Robespierre and Francis Thompson. You have not got the warm, responsive, sympathetic reaction which we find in the prepsychotic manic-depressive, but rather a reserved, intellectualized attitude—the brain very definitely rules the heart. In addition, there is a strong tendency to indulge in day-dreams, in which the person may live to such a dangerous degree that he no longer keeps contact with the real bustling world.

It is now becoming clear that such personalities are particularly liable to suffer shipwreck in dealing with certain problems. The chief among these are the masturbation problem, the adjustment to the demands of current morality, especially during adolescence, the adjustment to marriage and to economic difficulties. When such persons break down their upset is characterized by an increasing withdrawal from everyday life; contact with them tends to assume an unreal fantastic type resembling the kind of thinking we have in dreams or in fairy tales, and which we designate as delusional. When such a patient comes to us we are struck by his remoteness and the oddity of his thinking and acting. If we recall, however, that this latter is largely due to his thinking in another more fantastic manner, the fairy tale or day-dreaming way, we will gain considerable insight into his condition.

The symptoms of this condition are very various, but when we find bizarre delusions and hallucinations, with an uninterested or inadequate reaction to them, a slump in output, and the record of a previously seclusive personality in a young adult, we may be tolerably sure that we are dealing with a schizophrenia. It is necessary again to exclude organic states, particularly brain tumours, with the insidious deterioration of the personality which accompanies them. Hypochondriacal states are also to be differentiated. In juveniles it is found that hypochondriacal states sometimes pass on into a definite schizophrenic condition. The outlook, while less good than that of the manic-depressive, is nevertheless fairly satisfactory, provided that the previous makeup was sound, that the case comes early, and that the treatment is well directed. When the delusions are the major part of the picture, and when they are well connected, we talk of paranoia, a very exceedingly rare, intractable type of disorder. These are the two major psychoses which are suspected of having a psychic etiology.

Turning now to those cases where the etiology is definitely organic and toxic, we find that there are certain useful parallels between the reactions provoked by these two classes of agents. The most important parallel is that at least part of the picture produced by them is due to their releasing tendencies in the subject towards a manic, a depressive, or a schizophrenic reaction. The various types of organic and toxic agents, however, bring in a colouring of their own, so that the disease pictures may be superficially rather diverse. In addition to the tendency to release manic or depressive or schizophrenic-like pictures, all organic brain lesions tend to produce the organic brain syndrome which is composed of an impoverishment of judgment and capacity, an impoverishment of recent memory, so that the patient is only able to remember events in the far past. Together with this there goes a lability of mood, the patient flying into rages, or plunging into tears on very little provocation. The toxic agents also tend to produce a special form of reaction, namely, the delirium. The organic agents most commonly producing mental disorders are syphilis, tumours, and those agents which bring about arteriosclerosis and senile changes. All these agents will provoke the organic syndrome which, as already mentioned, may be coloured by an excitement, a depressive, or a schizophrenic reaction. The various pictures provoked by these different agents are readily differentiated from one another. Those produced by syphilis are revealed by the serological changes, and by a certain extravagance in the mental picture. Those provoked by tumours, by the neurological findings and, to a lesser extent, serological changes. The disorders due to arteriosclerosis or senile changes are readily differentiated from the above-mentioned, but are not so easily differentiated from each other. Roughly one may say that when arteriosclerosis is the factor at work seizures and transient paralysis will be in evidence, and moreover the reduction in capacity will not be such a wholesale one as in the case of the seniles. For example, in the case of an arteriosclerotic the memory may be very much worse than the judgment, while in the senile both suffer more or less alike.

The toxic agents producing mental disorder are numerous and various. First of all there are the poisons with which one amuses oneself—alcohol, morphia and cocaine. Then there are the bacterial poisons, and the poisons of metabolic origin. As mentioned before, these toxins tend to produce a delirium, but they may also release a manic, a depressive, a delusional or a schizophrenia-like reaction. They have all certain hall-marks by which one may recognize them. Alcohol produces delirium tremens, and has a special tendency to bring about a peripheral neuritis, which when linked on to the permanent brain damage which may be done by the drug, is described as a Korsakow reaction. The characteristic of the disorders due to cocaine is the great deterioration in character. Its presence as an active factor is further clinched by the marked withdrawal symptoms. Morphia also reveals its activity in a deterioration of the character which is, however, rather less rapid. With regard to the bacterial and metabolic poisons I will say little, save to mention the frequency with which influenza, diseases of the puerperium, and cardio-renal diseases are followed by mental disorder.

Having dealt with the psychogenic psychosis, the toxic and the organic psychosis, we now come to epilepsy, an orphaned disease, for, while in its earlier stages, the neurologist is only too glad to take it under his protection, he is more than pleased to resign his rights in favour of the psychiatrist when the disorder has progressed further. For deterioration, while not a constant feature, is frequent, and ultimately necessitates hospital care. In addition to this, these patients are liable to twilight states, *i.e.*, states into which they may pass spontaneously. This is rather rare, following a petit or grand mal attack. In these states they, like the senile, are only aware of certain of the factors in a situation, and may be guilty of incredible brutality. In making a diagnosis of epilepsy it is necessary to remember that the idiopathic group is steadily diminishing in size at the expense of its symptomatic brother. Particularly well hidden pitfalls in this direction are laid by slow growing tumours. Epileptiform seizures, too, may be one of the earliest signs of general paresis. One of our patients who came in as a manic general paretic had epileptiform seizures for seven years before the onset of psychotic symptoms. Epileptiform seizures, too, may be confused with hysterical seizures, but this can be obviated if one makes a rule of never diagnosing epilepsy on the seizures alone, and of being reserved in one's diagnosis until one has actually seen a seizure.

The mental defectives are now calling for a great deal larger share of the attention not only of the psychiatrist but the sociologist and the legislators as well. Up until now defectives have generally been classified in rather a crude fashion according to their appearance—microcephalic, macrocephalic and mongolian idiots. The growing interest in sterilization is now forcing us to strive to classify them according to their etiology, that is, we are anxious to know what percentage are due to actual poor stock, how much is due to a temporary impoverishment of the parents, *e.g.*, coitus during an alcoholic bout, and how much is due to intra-uterine diseases and accidents. The diagnosis is easy, for there is little difficulty in differentiating the dementia which arises from mental disorder from deficiency. The history gives you that. In defectives, too, however, there may be schizophrenic, depressive and excited episodes. These usually occur on very slight grounds, are rather feeble affairs, and soon pass off once the patient is in a protected environment.

Finally, we come to the psychoneuroses. These disorders are common in general practice, but, though they cause a great deal of unhappiness and inefficiency, as a rule they fight shy of coming to the psychiatrist, although he is now in a position to do more for them than for most other types of mental disorder. They do not come to him because they have been educated to the belief that there is something shameful about mental troubles, that they should be overcome by an effort of the will, and that if they fail to do this they must be crazy. Hysteria and the anxiety neuroses are among the most common of the psychoneuroses. The former manifests itself in paralyses and anæsthesias, the latter of the well known glove and stocking variety, in amnesias and in convulsions.

The anxiety neurosis is more widespread than one imagines. It finds its origin in harrowing situations from which there is no relief, in coitus interruptus, or indeed in all sorts of sex arousals without adequate outlet. It is to be found in young women who have early lost their husbands, as well as in business men who are carrying the strain of a failing corporation. There is a general attitude of anxious-mindedness—you see it in the people who arrive pathologically early for trains and their weddings. Then there are

the anxiety attacks. The patient suddenly feels terribly anxious, thinks he is going to die; things become oppressive and lowering and strangely forbidding around him. There is an acute feeling of anxiety which may last up to an hour or so.

Hypochondriasis is characterized by the occurrence of bodily complaints for which no adequate cause can be found, in a person in whom the personality is otherwise intact. These bodily complaints tend to shift from region to region, and the patient haunts the physician. He frequently undergoes operation after operation before it is finally realized that his condition arises from a mental disorder. He is frequently and aptly referred to as the chronic invalid. This condition is to be differentiated from the bodily preoccupations which occur in depressions, especially in the involutional period, and from the delusional notions in regard to bodily function which sometimes form a part of the schizophrenic picture. Careful examination of all the phenomena usually gives this without much difficulty.

Finally we come to discuss psychasthenia. This is characterized by compulsions and obsessions. The patient feels himself compelled to do things which he himself considers to be utterly foolish. For instance, he has to lie on his right side three times, and on his back three times, before he can finally turn over and go to sleep, or he may have to avoid stepping on any of the cracks on the street as he goes along. These rituals may develop to such a time consuming extent that he can no longer carry on his ordinary occupation efficiently. A character trait which frequently develops is extreme tenacity and obstinacy which renders treatment difficult.

A SMALL OUTBREAK OF ANTERIOR POLIOMYELITIS

BY M. R. STALKER, M.D.,

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IN reporting the following 15 cases of poliomyelitis, which occurred in this district, I realize that I am only doing what has already been done many times previously in a much more thorough manner from other sources. However, I hope to strengthen the claim for the treatment of this disease by convalescent serum. I also hope to demonstrate how simply a definite diagnosis may be arrived at by the aid of a spinal fluid examination. Lastly, I wish to draw attention to the possible source of at least some of these cases.

CASE 1

R. U., aged 3, was brought to the office on June 24th, 1931. The mother stated that he could not put his right heel to the floor. On examination it was found that there was a shortening of the tendo achillis and that he could not dorsi-flex that foot. On inquiry the mother stated that he had a febrile illness about November, 1930, lasting for three or four days, and that she had thought he had had "la grippe".

The father of this child keeps a small country store and delivers groceries and fruit to the surrounding farming district. This little boy helps to unpack the oranges. Goods from this store were received by 6 of the following 14 families that had poliomyelitis in their homes.

CASE 2

A. G., aged 6, came to the office on July 30th, 1931, with the history of being ill with fever and malaise on July 25th and 26th and recovering. He was now complaining of anorexia, malaise and soreness in his arms and egs. Examination revealed a very toxic lad. Temperature 100° F, a very fetid breath, but examination was otherwise negative.

July 31st.—Temperature, 102° F; pulse, 120; headache, pain in the limbs and the back of the neck; definite rigidity of the neck; a positive Kernig sign; the spinal fluid cell count was 250. No paralysis was evident. The boy was then removed to the Children's Memorial Hospital, Montreal, and during the journey he developed weakness in the quadriceps group of muscles. He was given 25 c.c. of convalescent serum intravenously, but the paralysis continued and involved muscles in both arms and both legs.

CASE 3

Baby C., aged 11 months, was seen at her home on August 1st, 1931. Her mother stated that she had vomited the day before, was listless, and complained on being moved. She was mildly toxic; temperature, 101° F.; pulse, 120. The general examination negative except that she complained when an attempt was made to flex her head on her chest. Spinal fluid cell count, 60. Twenty-five c.c. of convalescent serum were given intramuscularly. The next day she was less toxic; temperature, 100° F.; there was still some pain on flexing her head. The following day she appeared normal.

CASE 4

Baby R. J., aged 20 months, was seen at his home on August 4th; a restless child who did not wish to be moved; temperature, 102° F.; pulse, 140; some rigidity of his neck. The spinal fluid cell count was 60. Twenty-five c.c. convalescent serum were given intravenously. In two days he was quite normal.

CASE 5

M. N., aged 5, was seen at her home on August 6th. She had been ill for two days and was complaining of headache, malaise, pain in the neck and limbs. She was mildly toxic; the temperature was 102.2° F.; pulse, 140.

The neck was definitely rigid and there was a positive Kernig sign. Her spinal cell count was 80. Twenty-five c.c. of convalescent serum were given intravenously. The following day the child was less toxic and her temperature was lower, but the rigidity of her neck was still present (this rigidity did not entirely disappear for one week). On August 8th the knee jerk could not be obtained in the left leg and some weakness was observed in extending this leg. This weakness persisted for about one month and then gradually disappeared.

CASE 6

Miss O. H., aged 20 years, was seen at her home on August 15th, 1931. She had been ill from August 10th. She complained of persistent vomiting, headache, pain in her legs and neck. On examination it was found that her temperature was 101° F.; pulse, 140; breath, very fetid; neck, rigid; there were no abdominal reflexes on the right side, and the right knee-jerk was absent. She was also unable to extend the leg at the knee and could not dorsi-flex the right foot. The spinal cell count was 120. She was given 25 c.c. of convalescent serum intravenously. In two days her temperature was normal, but the rigidity of her neck did not entirely disappear for three weeks. The left trapezius muscle was found later to be paralyzed. At the time of writing she had almost completely recovered.

CASE 7

N. K., aged 4, was seen at home on August 17th, 1931. She had been ill for 24 hours and complained of headache. malaise and pain in her legs. She had a temperature of 102.3° F.; pulse, 140; neck, rigid; and the Kernig sign was suggestive. Her spinal cell count was 150. She was given 25 c.c. of convalescent serum intravenously. In two days her temperature was normal, but it was one week before the rigidity had disappeared. A slight weakness developed in the right quadriceps group of muscles, but this entirely cleared up within one month.

CASE 8

Mrs. W. T., aged 21, was seen at the office on August 20th, 1931. She complained of headache, pain in her neck and nausea. Her temperature was 99° F.; pulse, 80; and she had a fetid breath. She was very apprehensive of poliomyelitis and it was believed that fear was largely responsible for her symptoms. However, the following day she had an excruciating headache; temperature 100° F.; pulse, 100; very severe pain in her neck; a definitely retracted head; Kernig sign; and a spinal fluid cell count of 450. The spinal fluid was ground-glass in appearance. She was given 15 c.c. of convalescent serum intravenously (all that could be obtained at the time) and 50 c.c. of whole blood from a case who had had poliomyelitis twenty-five years previously. This blood was given intramuscularly. The next day her temperature was normal, and headache and pain in her neck much less severe. It was two weeks before the rigidity had disappeared. She recovered without any paralysis. In this case it is interesting to note that her two-year-old child had been ill one week previously for about three days with vomiting, fever and headache.

CASE 9

W. M., aged 14, seen at his home on August 22nd, 1931. He had been ill for three days with vomiting, fever, headache and on the third day had complained of pain in his neck. His temperature was 99.4° F.; pulse, 80. He had a fetid breath and a slight rigidity of his neck. His spinal fluid cell count was 35. He was not given serum. He complained of a weakness for the following month, but recovered without any paralysis.

CASE 10

J. L., aged 10, was seen at his home on August 23rd, 1931. He complained of headache, vomiting and pain in his neck. He had a temperature of 100° F.; pulse, 120; no rigidity of his neck; and was otherwise negative. A spinal puncture was refused. The following day his condition was much the same, with the exception that he had a slight stiffness of his neck. He was given 25 c.c. of convalescent serum intravenously. He recovered completely.

CASE 11

R. M., aged 5, was seen at his home on September 9th, 1931. He complained of headache, nausea, malaise and pain in his legs. His temperature was 102.3° F.; pulse, 130; and he had a very fetid breath. On September 10th his condition was much the same, except that he was more toxic and he had a rigid neck and a positive Kernig sign. He was given 25 c.c. of convalescent serum intravenously. His spinal fluid cell count was 120. In three days his temperature was normal and he recovered without any paralysis.

CASE 12

W. E., aged 6, was seen at his home at 10 a.m. September 9th, 1931. He complained of headache, pain in his legs, and pain in his neck. His temperature was 102° F.; pulse, 140; breath very fetid; there was no stiffness of his neck and he did not have a positive Kernig sign. At 8 p.m. the examination revealed that his neck was decidedly stiff and that he had a suggestive Kernig sign. The spinal fluid cell count was 200. He was given 25 c.c. of convalescent serum intravenously. The next day his condition was worse, in that his fever was higher, the pulse more rapid, the neck more rigid, and he had a very definite Kernig sign. The following day he was just as toxic and he could not extend his right leg at the knee and could not dorsi-flex his right foot. The serum was obtained from the Children's Memorial Hospital at a time that the ordinary adult serum was being used. However, it cannot be proved that the serum he received was ordinary adult serum, but the usual results obtained after administering serum were certainly absent.

CASE 13

I. Mc., aged 4, a patient of Dr. C. L. Roman, of Valleyfield, was seen with him at her home on September 10th, 1931. She had been ill for two days and complained of vomiting, headache, and malaise. She had a fever of 100° F.; pulse, 120; was mildly toxic, and complained of pain on bending her head forward. Her spinal fluid cell count was 56. She was given 25 c.c. of convalescent serum intravenously. She recovered without any paralysis.

CASE 14

J. L., aged 6, was seen at her home on November 23rd, 1931, complaining of headache, pain in her neck, diarrhœa and abdominal cramps. Her temperature was 102° F.; pulse, 120; general examination was negative and she had no stiffness of her neck. On November 24th her condition was the same. On November 25th she complained bitterly of the pain in her neck and she had a definite rigidity of her neck and also a suggestive Kernig sign. The spinal fluid cell count was 150. She was given 25 c.c. of convalescent serum intravenously. On November 26th the knee-jerks could not be obtained in either leg and she had difficulty in extending her legs at the knees, but this passed off during the following two weeks and she recovered without any paralysis.

CASE 15

E. V., aged 10, was seen at her home on February 15th, 1932. She had been ill for two days, complaining of headache, vomiting, and, during the second day, pain in her neck. Her temperature was 101° F.; pulse, 140; she had a very fetid breath, a definitely stiff neck, and a positive Kernig sign. The spinal cell count was 110. She was given 25 c.c. of convalescent serum intravenously. She recovered without any paralysis, but it was two weeks before the stiffness of her neck entirely disappeared.

COMMENTS

In addition to the above, many cases were seen in which poliomyelitis was suspected and the spinal fluid was examined in several cases. In

each instance where there was stiffness of the neck and difficulty in flexing the head on the chest an abnormally high cell count was found. In the cases in which the spinal fluid was examined, and where there was no stiffness of the neck, the spinal fluid was always found to be normal.

Given a case in which fever and stiffness of the neck are present, the spinal fluid should be examined. If the cell count is more than ten, then poliomyelitis, tuberculous meningitis, and cerebrospinal fever are the important possible causes. In cerebrospinal fever the cell count would be very high and the meningococcus could be demonstrated. In tuberculous meningitis the tuberculous bacillus might be demonstrated, but if in doubt the case should be treated as one of poliomyelitis and time will shortly tell the tale.

Fifteen definite cases of poliomyelitis are reported without any fatalities. Eleven cases received convalescent serum in the preparalytic stage and of these 11 cases 10 did not develop paralysis, and there is a possibility in the case where paralysis developed that ordinary adult serum was employed.

Case No. 2 illustrates the dromedary type of the disease. Case No. 8, I believe, illustrates the fulminating type of the disease, in which early treatment gave a very gratifying result.

One clinical sign is present in the majority of these cases, *i.e.*, the presence of a very fetid breath. It would lead one to believe that the nidus of the infection might be in the mouth or the nasal passages.

The first case reported was possibly a "carrier", and the infection may have been transmitted at least to some of the patients by means of groceries or fruit.

Case Reports

A CASE OF PROPTOSIS OF THE EYE DUE TO TRAUMATIC ANEURYSM*

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Any literature dealing with this subject is dealt with under the heading of pulsating exophthalmos. Fuchs's latest edition by Duane has a small paragraph on the condition, in which he states that the cause is an arterio-venous aneurysm of traumatic origin in the cavernous sinus. Up to 1927 there were 300 cases on record.

As a rule the condition is of intracranial origin, the protrusion of the eye-ball and the other symptoms being secondary. Post-mortem examination shows that about 50 per cent are due to arterio-venous aneurysm in the cavernous sinus and, according to de Schweinitz, 60 per cent of these are traumatic. Other possible causes are extremely vascular tumours within the orbit, an aneurysm of the ophthalmic artery, and varicosity of the ophthalmic veins.

As there have been only 19 post-mortem reports on these cases, it is difficult to state percentages of causative factors except those above quoted. In 2 cases of the 19 aneurysm of the ophthalmic artery was present. One case of vascular tumour of the orbit, and 1 of varicosity of the ophthalmic veins were demonstrated. The cause could not be determined in 6 out of the 19 cases. Rupture of the internal carotid into the cavernous sinus is most frequently caused by basal fractures. In the case reported the cause was a puncture wound.

The diagnosis is not difficult, once pulsation is established, but in the absence of this sign is entirely a matter of conjecture.

The objective findings are proptosis, pulsation felt on applying the palm of the hand over the protruding eye-ball, a bruit heard over the eye-ball or in the temporal or frontal areas, engorgement of veins of the lid and of the retina, and the patient's own complaint of a "throbbing of the head, particularly in the ear of the affected side." Finger pressure over the carotid stops pulsation, bruit and throbbing.

The explanation of the above symptoms is suggested by Ball as follows. With arterio-venous communication we have obstruction of the venous outflow of blood, which induces marked distension and varicosity of the veins. The blood current then becomes reversed and the distended veins carry arterial blood. At this stage pulsation commences. As more or less time is required for these changes to take place, and as, indeed, they may not take place, pulsa-

* Read before the Section of Ophthalmology, Academy of Medicine, Toronto, December 14, 1931.

tion may not occur early, nor need it occur at all.

In the matter of treatment everything from daily compression of the common carotid on the affected side to ligation of both common carotids has been tried. De Schweinitz reports cure or improvement in 64 per cent of the cases and death in 10 per cent by the ligation of the common carotid. The middle course of treatment would appear to be ligation of the internal carotid, which shows 40 per cent of cures, and in cases of failure to tie off the common carotid of the same side.

CASE REPORT

Mr. J. S., aged 20 years. The family history, personal history, and previous illness have no connection with present complaint.

Present illness.—On August 12, 1931, while engaged in a friendly duel with pitch forks with a fellow worker on the farm, one prong of his opponent's fork entered the orbital cavity immediately beneath the supraorbital ridge. He did not lose consciousness, but his gait was rather unsteady when he reported to Dr. S. S. English in Simcoe, two hours later. I saw him four hours after the injury.

The pupil was semi-dilated; no reaction to light or accommodation. The movements of the eye-ball were normal. There was some slight conjunctival injection. The fundus examination was negative. The patient was able to distinguish fingers at a distance of 20 feet without difficulty.

He remained in hospital for two weeks and was then allowed to go home. He was again seen by me on October 2, 1931. My office notes are as follows: "Ptosis of upper lid, marked protrusion of eye-ball; complete ophthalmoplegia of the eye-ball; anæsthesia of upper lid and of an area extending over the frontal region of that side. Pupil dilated—inactive to light. Vision was 20/80—fundus was normal."

He was re-admitted to hospital and during next few days examination of sinuses and the orbital cavity by x-ray gave no information. The red cell count was 4,800,000 and white blood cells 7,400. The temperature was normal and the Wassermann test was negative.

On October 26th, ten weeks after the original injury, pulsation was first discernible by placing the palm of the hand over the protuberant eye-ball. With a stethoscope placed over the upper lid, a bruit, as distinct and clear as heard over the chest in aortic aneurysm, developed during the next few days. On pressure over the common carotid the bruit almost entirely disappeared. During these few days, following the beginning of pulsation, the patient first complained of a sensation of fullness in the left ear. By placing one end of a rubber tubing that we ordinarily use in eustachian catheterization in the patient's ear and the other in our own ear the same bruit could be heard. The diagnosis of carotid aneurysm naturally followed.

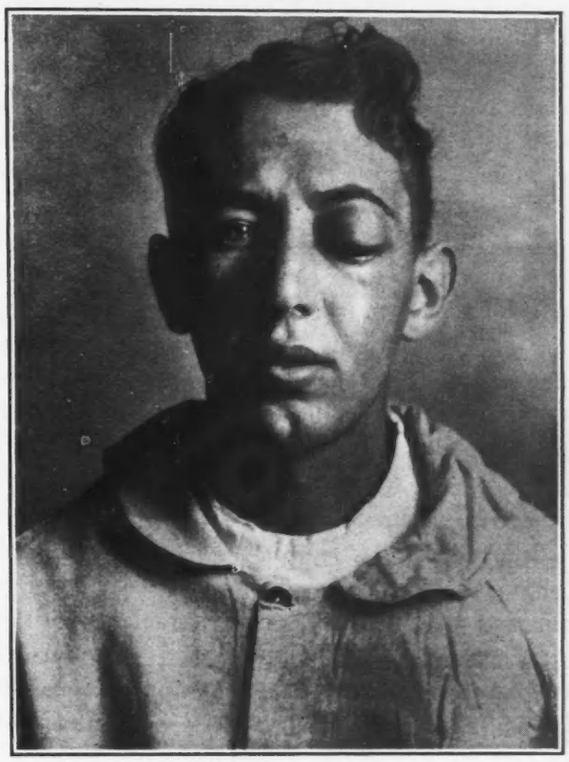

FIG. 1

On November 3, 1931, the internal carotid was ligated under gas and oxygen anæsthesia. When the patient left the operating table, the cornea and conjunctival sac were very dry and the proptosis was decreased by at least 30 per cent. The patient was returned to bed and never regained consciousness. The right side of the body was completely paralyzed, the face was not affected, the proptosis still decreasing.

Thirty-six hours after operation, cyanosis, a temperature of 105°, respirations 32 and a pulse of 140 were present. The eye-ball, which had previously been fixed, was moving freely; the pupil was small and reacted to light. The

patient died approximately forty hours after ligation.

Post mortem.—Permission was given only for a partial examination.

The calvarium was removed and the brain dissected from its attachments. Gross examination of the brain showed an area which we regarded as an abscess in the left temporal lobe. Culture was reported in forty-eight hours as giving *Staph. aureus.* The cavernous sinus was opened and was found to be filled with a blood clot. The carotid artery was enlarged but no arterio-venous communication could be made out. The ophthalmic artery was also the seat of a blood clot which was probably post-mortem. The essential findings are as given below.

Gross description.—"Entire brain submitted. Left temporal lobe shows extensive degenerative changes in the inferior surface. The cortex is soft, friable and ragged in appearance. The cut surface shows disorganization of the superficial layers but there is no evidence of involvement of the deeper tissues. There is nothing to suggest new growth. The brain otherwise is not remarkable.

Microscopic description.—Section of the left temporal lobe shows extensive degenerative changes with loss of cell and nuclear outline, abnormal staining reaction, and considerable vacuolation. The vessel walls appear to be of normal thickness although in some areas they appear to contain a fibrinous clot somewhat suggesting thrombus. There is no evidence of new growth.

Diagnosis.—"Cerebral softening, probably secondary to thrombosis."

The hospital records with the progress notes, x-ray plates, and reports, with an excellent picture showing the proptosis a few hours before operation, are available. I regret that pictures showing the decrease in proptosis were not taken after death.

COMMENT

This case was of interest to me because of the rarity of the condition and because of the difficulty in diagnosis. The young man sustained his injury on August 12, 1931. Ptosis of the upper lid, with anæsthesia of the frontal area and beginning proptosis, appeared three weeks later. Total ophthalmoplegia was present, six weeks after injury, and yet there was no pulsation or bruit. This last sign was first discovered on October 2, 1931, ten weeks after injury. Granted that we were right in diagnosis, it is difficult to explain the delay in the appearance of these findings unless we accept the opinion of Ball that pulsation only occurs after reversed circulation is established, which takes some time.

LUNATE OSTEOMALACIA OR KIENBOCH'S DISEASE

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Lunate osteomalacia is a peculiar lesion of the lunate or semilunar bone of the wrist resulting in necrosis. Kienboch,[1] in 1910, first described the x-ray appearance, and so the disease is often called "Kienboch's disease".

Various writers have reported on this condition, using terminology which accords with their individual conceptions of either the causative factor or the underlying pathological process. At the present time all are not agreed on the etiology of the condition. The various causes to which it has been ascribed are as follows:—(1) abnormal anatomical conditions incident to the lunate bone, *e.g.*, embolism may result from poor blood supply; (2) repeated compression strains; (3) a single severe compression force; in this regard one is impressed with the similarity of the pathological changes in this disease as compared with those in post-traumatic vertebral collapse (Kummel's disease). Some say Kohler's disease of the tarsal navicular is the same disease. (4) Streptococcus infection. D. B. Phemister[11] reported on a study of cultures from biopsy material in cases of Kienboch's disease, Kohler's disease of the tarsal navicular, and Legg-Perthe's disease. It was shown that the presence of *S. viridans* was found often enough in these cases to indicate that streptococci play an important rôle in the cause of these conditions. It has also been suggested as being the cause of Osgood-Schlatter's disease of the tibial tubercle. Whether in these cases the organisms reach the bone as an embolus which blocks the main artery, or whether they lodge

there alone remains undetermined. The usual history is that of an insidious onset without severe injury, often none at all, with a long period of development and slow appearance of symptoms.

The x-ray picture shows a fault in shape, or size, or detail, or all together. In later stages the normal cancellous architecture is replaced by a disintegrated appearance with marked rarefaction, ill defined margins, and considerable shrinkage.

The prognosis is not good and nothing very beneficial as regards cure is known. Rest and splinting have been tried and surgical removal of the bone does not materially reduce the disability.

CASE REPORT

W.S., a white male, aged 53, was seen by me in November, 1931.

Complaints.—Pain in the left wrist on movement since November, 1930; swelling on dorsum

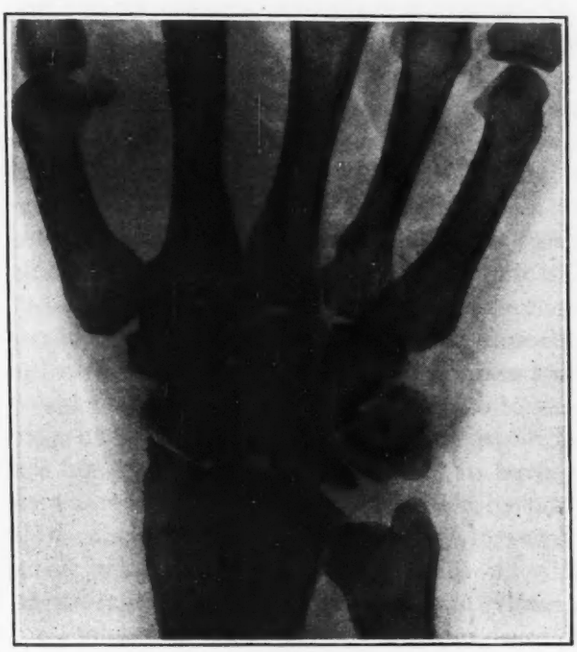

FIG. 1

of left wrist noted soon after the onset of pain; limitation of flexion and extension at the left wrist.

Personal history.—A carpenter by trade. He said he was accustomed to rest his left hand, either flexed or extended, on the floor while driving nails with the other hand. There was no history of injury causing loss of time. He had had chronic otitis media since the age of 14 years; influenza in 1917; an accident in 1919, resulting in a fractured rib on the right side.

He was otherwise always healthy. Rheumatic fever and venereal disease were denied.

Family history.—No other case of a similar condition in his parents or relatives.

Physical examination. — Chronic bilateral otitis media and left inguinal hernia were noted.

On the dorsum of the left wrist, corresponding with the location of the semilunar bone, was a hard immovable swelling. It was tender to touch and painful when the hand was flexed or extended. There was 15° of limitation of flexion and about 10° of limitation of extension.

The x-ray showed malformation, rarefaction, and an ill-defined margin of the bone. There was also some shrinkage of the bone.

COMMENTS

1. The cause of Kienboch's disease is undetermined.
2. Pathologically it is a rarefying osteitis.
3. The lesion results in a major degree of disability.
4. Surgical removal of the bone does not materially reduce the disability.

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SPONTANEOUS RUPTURE OF THE THYROID GLAND

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Spontaneous hæmorrhage into a cystic adenoma of the thyroid gland is of frequent occurrence. The case to be reported, however, is considered unusual in that a spontaneous hæmorrhage originating in an adenomatous cyst ruptured completely through the thyroid capsule, infiltrated the muscle and fascial planes of the neck,

spread into the mediastinum, and was of sufficient severity to cause death.

CASE REPORT

Mrs. E. K., aet. 68, was first seen on November 20th, 1929, when she complained of vomiting blood, which seemed to come from the stomach. During the following day she passed characteristic tarry stools, and this tended to confirm a diagnosis of a gastric or duodenal lesion with hæmorrhage. At the time of the initial examination it was noted that the patient had an irregular swelling of the thyroid gland. The enlargement was nodular and one or two of the nodules were elastic to the touch.

This patient was seen more or less continuously during the winter of 1929-1930, when her chief complaint was pain, attributed to a chronic osteo-arthritis involving the hands, feet, and spine. She was always very thin. She had a rapid pulse, varying from 90 to 108, with an average systolic blood pressure of 140 and a diastolic of 80. Iron was given, and some sodium iodide intravenously. The latter seemed to help her arthritis. Because of her age and semi-invalid condition it was not considered advisable to attempt anything relative to her thyroid.

On June 1, 1930, she got up in the morning, apparently in good health. While eating her breakfast she choked on a piece of bacon, and coughed a little in her effort to remove the particle. Within a short space of time she felt a tightness in her neck, her neck appeared swollen, and she experienced some difficulty in breathing. During the early afternoon she remained quiet and the dyspnœa decreased. Towards evening she moved about a little, and the swelling began immediately to increase, and at 6.30 p.m., when she was first seen, her condition was as follows:—She was sitting up, and had an anxious expression. Her face was of a dusky grey colour, her eyes congested and a little protruding. There was a very definite increased enlargement of the neck. This was greatest over the thyroid gland, but there was a fairly uniform swelling extending from just below the chin to the clavicles and laterally over the anterior half of the neck. This enlargement was tense, and under observation the skin and superficial fascia below the clavicles began to be infiltrated. There was a marked stridor to her breathing. She was hoarse, and her pulse was rapid and weak, with poor volume.

The patient was placed in a semi-sitting position with her head well supported, and ice was applied to the neck. Artificial ventilation was employed through the use of electric fans, and morphia and a cardiac stimulant were given. After consultation and careful observation for an hour, during which the dyspnœa subsided a little, only to recur on the slightest movement, it was decided to operate in an endeavour to stop the bleeding and so relieve the pressure which was threatening the patient's life through asphyxia. The patient was transferred to the hospital by ambulance, and the operation was proceeded with after an emergency preparation.

Using a local anæsthetic, ½ per cent novocaine supplemented by gas oxygen, the usual collar incision was made. At the beginning of the operation the patient was of a dusky grey colour attributed to asphyxia from pressure. After dividing the superficial layers of muscle the hæmorrhage became severe. Clots were removed from between the muscle planes and the blood welled up from the lateral surface of the lower pole of the right lobe. The inferior thyroid artery on the right side was found to be bleeding freely. This was clamped but the hæmorrhage continued to be very severe. Separation of the muscles and fascia showed these to be infiltrated down to the apex of the lung and into the mediastinum. Part of the right lobe was clamped and removed but bleeding continued. Respirations became shallow, the pulse imperceptible and the patient died on the operating table about five minutes after the initial incision. Although there was considerable loss of blood, shock seemed to play a considerable part in the cause of death.

Pathological report.—Two pieces of gland were removed in the course of the operation and the pathological report is as follows; "The specimen consists of two masses of thyroid tissue. It is fleshy in colour, one area in particular being intensely hæmorrhagic. It is adenomatous to the touch, and, on section, many adenomata are found. Many calcified areas are present, and numerous cysts are found. Microscopic sections of this tissue show the presence of much colloid material, with areas of acini showing degenerative changes. There are several areas of round-celled infiltration scattered throughout and several areas of calcification. There is also some cyst formation. The cell nuclei stain faintly. The acini appear regular in arrangement, showing no hyperplastic changes. The pathological diagnosis

is colloid adenoma with cystic and calcareous degeneration, and chronic inflammatory change."

REVIEW OF THE LITERATURE

We were confirmed in our opinion that although spontaneous hæmorrhage into the thyroid is frequent such an extensive hæmorrhage as in the case cited is indeed rare. Von Ziemacki[1] reports a case in an elderly woman with somewhat similar symptoms, *i.e.*, dyspnœa, dysphagia, pallor, and signs of so-called 'agony'. With rest and symptomatic treatment recovery occurred. He says that he has had no similar case in 30 years, and in a review of the German literature he found only two cases somewhat analogous, and one of these was traumatic in origin. Paul Simon[2] reports a case of rapid death in a man receiving a blow over the thyroid gland. Dr. Simon in his capacity as coroner conducted an autopsy, at which it was shown that the man had a large hæmorrhage into a cystic adenoma, which had caused asphyxia and death. The hæmorrhage had been localized to one side, but the opposite lobe showed a similar cystic degeneration on the strength of which the accused was acquitted.

Evans[3] reports a case of dyspnœa developing suddenly in a woman who had an enlarged thyroid for years. Operation relieved the symptoms, but here the hæmorrhage was due to a hæmatoma in a large extension of the thyroid gland protruding down under the sternum. The hæmorrhage was entirely intracapsular. André Richard[4] details a case of a cystic adenoma in a woman aged 21, suffering from an enlarged thyroid for years. Six days following an automobile accident she suddenly developed asphyxia which was relieved by operation. At the operation a large thin-walled cyst was found full of muco-sanguineous fluid, which through pressure on the trachea caused the asphyxial symptoms. Deegan[5] similarly reports a case of dyspnœa relieved by operation, at which the cause was found to be a hæmorrhage into an adenoma in a patient who had suffered from mild thyroid symptoms for years.

Plummer[6] reports 4 cases of hæmorrhage into cystic adenomata, and gives the typical symptoms as being a sudden acute painful enlargement. In three of his cases there was a history suggesting an acute respiratory infection, and some tonsillitis, but pathological examination showed no special inflammatory infiltration in the walls of the adenoma. Ballin and Morse[7] comment on the frequency of hæmorrhagic processes in the thyroid gland responsible for the sudden onset of thyroidism. Hæmorrhage occurs most frequently from direct trauma to the neck, the breaking of a thin-walled cyst, or from an infectious embolus. Large hæmorrhages may cause severe dyspnœa and often suffocation. They quote Wolfer[8], who says that such hæmorrhages occur almost always in the adenomatous tissue and not in the thyroid gland itself. They are caused by the extreme thinness of the abundant vessels, especially the veins and more particularly the angiocavernous portions of the goitre.

Boyd[9] draws attention to the occurrence of degenerative changes in the thyroid adenomata, —more particularly the fetal adenomata. Hæmorrhage into the loose interstitial tissue is of frequent occurrence and may lead to a sudden enlargement in the size of the goitre. Most textbooks mention that among the degenerative changes occurring in thyroid adenomata hæmorrhagic degeneration occurs early and often. Schwoerer[10] made an extensive survey of spontaneous hæmorrhage into the thyroid gland, and reported 18 cases out of 2,500 thyroid operations from the years 1906 to 1923. Seven of these cases were observed from 1906 to 1917, and 11 from 1917 to 1923. Seventy-seven point seven per cent of the cases occurred in women and of the 18 2 were in malignant thyroids, 1 in an adenoma, and 15 in those showing colloid degeneration. Hæmorrhage came on most frequently after cough, and tracheotomy was performed in 7 of the cases. Twenty-seven point seven per cent or 5 out of the 18 cases, proved fatal. None of these cases showed hæmorrhage rupturing through the thyroid capsule and spreading down into the mediastinum.

SUMMARY

1. The frequency of spontaneous hæmorrhage into the thyroid gland is well established.

2. Furthermore, this takes place most often into thyroid adenomata, and particularly into those which show cystic degeneration.

3. Pathological examination of the thyroid tissue removed in this case shows multiple cysts with inflammatory reaction, and extensive hæmorrhage into the cystic areas and the interstitial tissue.

4. The unique feature of this case is the extent of the hæmorrhage. The bleeding seemed to originate from vessels at the lower pole or from an angiocavernous vein in a cyst wall. From

here there was an extensive rupture through the thyroid capsule, with infiltration of the muscle planes and superficial tissues down to the apices of the lung and the mediastinum.

5. One similar case, that of Von Ziemacki[1] has been reported under the very apt title "A case of 'Apoplexia Glandulæ Thyroideæ'.". Because of the rarity of so extensive a hæmorrhage our case seemed worth reporting.

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7. BALLIN AND MORSE, *Ann. Clin. Med.* (Balt.), 1925-6, **4**: 613.
8. WOLFER, Dionys Hellin, published by Wolff, Munich, 1893.
9. BOYD, Surgical Pathology, Saunders, Phila., 1925, p. 247.
10. SCHWOERER, *Beitr. z. klin. Chir., Tübin.* 1924, **131**: 359.

Editorial

FRAGILITAS OSSIUM

THE article by Drs. Turner and McLellan in this issue of the *Journal*, in which they describe four cases of fragilitas ossium, serves to focus our attention anew on a very remarkable malady. The condition was first described by Lobstein in 1833 under the name "osteopsathyrosis", and up to 1913 Bamberg and Huldschinsky[1] found only 105 cases of it in the literature. Within the last two years, however, a considerable number have been reported, and one gets the impression that the affection is by no means so rare as was at first thought. No cases have been published in our *Journal* since 1917, when Alton Goldbloom recorded one. The cases of Drs. Turner and McLellan exhibit the family grouping that has so often been observed, though it is unfortunate that here the antecedent family history could not be fully obtained, but in Doctor Goldbloom's case no hereditary taint or predisposition could be traced.

A number of designations have been applied to this affection—fragilitas ossium, osteogenesis imperfecta, osteopsathyrosis—and confusion reigns and will reign until the riddle of its pathogenesis and that of similar conditions has been solved. Vrolik (1849) and Stilling described osteogenesis imperfecta as a congenital and intrauterine condition, and, apparently, separated it from the post-natal cases of fragilitas ossium. It seems to be generally agreed now, however, that the pre-natal and post-natal cases are the same, pathologically speaking, and it would be proper, therefore, to speak of *osteogenesis imperfecta congenita* and *osteogenesis imperfecta tarda*. In the meantime it would seem that *fragilitas ossium* is the most suitable term, inasmuch as it draws attention to the most striking objective sign and is non-committal as to etiology and pathology.

Fragility of the bones may become manifest at any time of life, from the intra-uterine period to advanced age, but it is most common in infancy and youth. It is twice as common in males as in females. The fractures are single, multiple, and frequently recurring, and are due to trifling traumatism or to none at all. Turning over in bed, the stepping down a few inches, the pinning of a napkin on an infant have been sufficient causes. The cases that occur *in utero* are possibly due to the sudden jerky movements which characterize the fetus, or to the pressure of amniotic bands. There need not be any traumatism to the mother. As many as a hundred consecutive fractures have been recorded. The tendency is for the disease to become ameliorated as middle age is approached. This is well illustrated in Goldbloom's case, a man of thirty-three years, who had had forty-nine fractures, forty of which occurred before he was fifteen years of age. The first occurred when he was fifteen months old.

The fractures are usually in the long bones or ribs, but signs of imperfect ossification have not infrequently been noted in the calvarium, which may present the character of a membrane in which are scattered more or less numerous spicules or flattened islets of bone, after the fashion of a mosaic. A

1. Bamberg and Huldschinsky, *Jahrb. f. Kinderh.*, 1913, **78**: (Ergänzungsheft) 214.
2. Goldbloom, *Can. Med. Ass. J.*, 1917, **7**: 636.

curious flattening of the ribs may be found, possibly the result of atmospheric pressure incident to the respiratory act exerted on a soft, badly calcified bone. This can be well seen in the skiagrams illustrating the paper of Drs. Turner and McLellan. Other features are imperfect calcification of the enamel of the teeth, with abnormal translucency, and, occasionally, otosclerosis and an increase in the bitemporal diameter of the skull. A pathognomonic sign of the affection is blue scleræ, which are frequently present, a point first noted by Eddowes in 1900. This has been attributed to an abnormal thinness of the scleræ or to a deficiency of lime salts which permits the pigment of the choroid to show through. Those persons with white scleræ never manifest fragilitas ossium, and those with blue scleræ do not always suffer from fragilitas. It should be noted here that care must be taken in diagnosing "blue scleræ"; blueness of the scleræ of a slight grade is so common in infancy as to be physiological. The physiological should not be mistaken for the pathological; it is all a matter of degree.

The common familial occurrence of the affection of course suggests a hereditary influence. Van der Veer and Dickinson[3] think that this is a factor in less than ten per cent of cases. Fairbank[4] places it as high as twenty-eight per cent. The tendency to fragilitas ossium has been traced through four or five generations, and, curiously, the affection has never been known to skip a generation.

There is no demonstrable relationship between fragilitas ossium and certain other bone conditions, tuberculosis, syphilis, and osteitis deformans. In all of these the condition is acquired and not inherited. There is, however, at least a superficial similarity between fragilitas ossium and chondrodystrophia fetalis (achondroplasia) and osteomalacia. Chondrodystrophia is characterized by disturbance in endochondral ossification, premature synostosis of the os tribasilare, and stunting in length of the limbs (micromelia); the trunk is normal, except for lordosis. In the case of fragilitas ossium the whole body is involved, and not the bones only but the teeth and scleræ. Osteomalacia occurs in adults, chiefly women, and is aggravated by pregnancy and lactation. It is by many regarded as adult rickets.

In fragilitas ossium microscopic section of the bone shews that the trabeculæ are attenuated, scanty, and widely separated; the laminæ are imperfectly formed or entirely wanting, and the Haversian systems are defective.

Curiously, we find cases that overlap. Absorption of bone and fragility may occur in chondrodystrophia, as Bircher, the Countess von Geldern-Egmond[5], and Hektoen[6] shewed years ago. Hektoen's case was in a micromelic dwarf with osteoporosis, multiple fractures, 172 Wormian bones in the skull, and a fibrous thyroid gland. Even inheritance, it would appear, may bring into association different though similar types of bony disturbance. Crooks[7] has recently reported a case of osteogenesis imperfecta in a girl seven weeks old whose mother was suffering from osteitis deformans. The plasma phosphatase of the baby was 0.3 unit and that of the mother 0.45 unit. (The normal in childhood is 0.15 to 0.25 and in adult life 0.1 to 0.2.)

The pathogenesis of this curious affection is by no means clear, though a number of alluring speculations are opened up. It would be surprising, indeed, if endocrine disturbance had not been invoked. No convincing evidence of the truth of this idea has been advanced. Fibroid changes in the thyroid gland have been noted (Hektoen), and Niklas[8] found a hyperplastic thyroid and ovaries. Gorter, recently, has reported rather striking benefit in two cases from the administration of thymus gland. Against this it may be urged that cases of fragilitas occur in which the process is confined to one bone, the femur or humerus, and that it occurs so early in fetal life that a disturbance of the glands of internal secretion seems hardly possible. Much more likely are we dealing with a developmental defect wherein there is deficient deposition of calcium salts in the bones. Further, all the available

3. Van der Veer and Dickinson, *Ann. of Surg.*, 1921, **74**: 629.
4. Fairbank, *Proc. Roy. Soc. Med.*, 1930, **23**: 1263.
5. von Geldern-Egmond, Inaug. Diss., Zürich, 1897.
6. Hektoen, *Amer. J. Med. Sc.*, 1903, **125**: 751.
7. Crooks, *Brit. M. J.*, 1932, **1**: 705.
8. Niklas, *Ziegler's Beitr.*, 1915, **61**: 101.

evidence goes to shew that the vitium is an imperfect laying-down of calcium salts by the osteoblasts, rather than excessive resorption of the same. This process is connected with sub-periosteal and not with endochondral osteogenesis. The shafts of the long bones are often thin and shell-like, while the ends of the bones and the epiphyseal cartilages retain their normal characters. This can be seen in the skiagrams which illustrate the article of Drs. Turner and McLellan. In fact, the generalization may be made that osteogenesis imperfecta is a disturbance of intramembranous and not of cartilaginous osteogenesis. In this the affection is in marked contrast with achondroplasia.

But what is the rationale of this remarkable process? We cannot say. Robison's work[9] should be referred to here, as it is of fundamental importance. He discovered an enzyme—phosphatase—which effects the hydrolysis of certain phosphoric esters in the blood and this results in the deposition of calcium phosphate in certain places. This ferment is plentiful only in the ossifying portions of normal bones and is lacking in the non-ossifying cartilage. Further, Kay[10] states that the phosphatase is secreted by the osteoblasts and also by the hypertrophic cartilage cells. Possibly, in osteogenesis imperfecta, the osteoblasts are deficient, and, consequently, the formation of the necessary enzyme is also deficient. Unfortunately, no researches along these lines appear to have been carried out in the case of the affection under review. It is, of course, difficult to get enough cases for this kind of study. Estimations of the amount of calcium in the blood and urine have been made, but the findings are conflicting.

The theory has been advanced that in osteogenesis imperfecta we are really dealing with a deficiency of osteoblastic function based on some general mesenchymal vitium. We should like to know whether the changes that are so marked in the enamel of the teeth are of the same nature as those occurring in the bones. If so, the mesenchymal theory would have to go by the board, for the teeth are epidermal. For the present the matter remains here. There is much need for further research.

A. G. N.

9. Robison, *Biochem. J.*, 1923, **17**: 286.

10. Kay, *Brit. J. Exper. Path.*, 1927, **7**: 177.

THE BRITISH MEDICAL ASSOCIATION

ONE hundred years is a long life for any institution, especially when viewed through the eyes of "Young Canada." It may safely be stated that such longevity indicates sound fundamental organization at birth, healthy growth, and particularly an accomplishment of usefulness to the constituency it serves.

The British Medical Association was born at Worcester on July 10, 1832 and its founder was Charles Hastings. At this pioneer meeting there were fifty medical men present, some of whom travelled considerable distances by the slow and uncomfortable facilities of the times.

The first Branch of the Association was established in 1835—the East Anglian. In 1857 the Association, which was already publishing a weekly paper, renamed it the *British Medical Journal* and sent it each week to 3,000 readers. The Association now extends throughout the British Empire; it is organized in 100 Branches and 250 Divisions; its membership is over 35,000; and the circulation of its *Journal* is over 39,000 copies each week.

The Association will celebrate, from July 21st to 30th of this year, its Centenary at Worcester, its cradle, and at London, its headquarters.

From a survey of the history of the development of the Association, still more from repeated conference in recent years with many of those more closely engaged in the guidance of its affairs, the writer dares to ascribe the acknowledged success of the institution mainly to two factors, first, the recognition that the "Association" is primarily for the benefit of the individual members and through them to the public, and, secondly, that there have always been available men of character and of vision to

guide the deliberations and execute the decisions of the governing bodies.

Sir Charles Hastings was such a man; also Victor Horsley, who although he was not and never had been a general practitioner, laboured long and earnestly in their behalf and in the interests of the community they serve. Another, to whose memory the members of the Canadian Medical Association delight to pay tribute, is Sir Jenner Verrall, whose high idealism of "Imperial Medicine", uncanny ability to discover and cut the Gordian knot of a difficult problem, and logical, though generous, argument paved the way to the affiliation with the British Medical Association, of which we Canadians are so justly proud.

Much time and space could be devoted to abstracting the excellent history of the Association compiled by Mr. Muirhead Little, and now appearing in the issues of the *British Medical Journal*. But for an exposition of the traditions, the ideals, in fact the 'soul' of the Association, we would commend perusal of an address by Dr. Alfred Cox, Medical Secretary, published in the issue of March 19, 1932, and entitled "A Confession of Faith." A very full abstract of this can be found in the current issue of our own *Journal* A peculiar significance attaches to this address inasmuch as it was delivered before the North of England Branch in which the author, to quote his own words, "got my first love for the Association, and where I received that training which led me to the office I now hold." This was in 1893.

In 1900 the Association was in difficulties as there was dissatisfaction with the constitution referring to representation. In 1899 the Medical Guild of Manchester, an organization quite outside the Association called a conference of delegates from societies and associations of general practitioners throughout the country which threatened the formation of a rival society and disruption of the older association. We glean from Mr. Muirhead Little's history (*Brit. M.J.*, March 26, 1932) that "Dr. Alfred Cox, of Gateshead, effectively argued the case for reform *within* the Association" and saved the day.

We can best develop our theme by quoting, perhaps disjointedly, from "A Confession of Faith."

"The 'nineties were a hard time' for a young practitioner. The profession was suffering from internal competition, little mitigated by sentimental scruples about ethics or etiquette." "Our Association had taken little interest in the economic affairs of its individual members, and indeed was not so constituted that it could do anything effective."

"We have changed all that, and when I say 'we' I mean our Association"—"an organization which is able and willing to ascertain the collective views (of the profession) and to carry out its wishes in so far as this can be done *with due regard to the general public interest*"—"we have recognized that, although we exist primarily to protect the interests of our members, yet our members themselves exist for the good of the public they serve." "I prefer to speak of the medical 'tradition' rather than of medical 'etiquette'. The fundamental article of faith of the doctor is that the interests of the patient must always come first."

"One of the best things our Association has done has been the cultivation in its members of the habit of regular contact, whether for discussion of cases or medico-political matters, or for purely social functions."

Referring to Horsley, Dr. Cox says "Horsley was a great believer in the doctrine that a really useful professional organization should get its blow in first; that as it knew more, or ought to know more, of the medical needs of the community than anyone else, it should not wait for the politician to make the first move, but should put up constructive proposals which, whether adopted or not, would tend to lead the thoughts of the public along the right paths, in anticipation of political action."

Dr. Cox pays a warm tribute to the men and women with whom his office has brought him in contact. "There must be something fine in an Association which can command the devoted service of a constant stream of the best men and women in our profession" and he quotes the views of the late Dawson Williams, formerly Editor of the *British Medical Journal.*, who "held fast by the view that if the profession was to maintain and improve its place in the public estima-

tion, it must constantly strive to increase the efficiency of its services to the public, when other things would be added to it."

The concluding sentences of "A Confession of Faith" are:

"It (the Association) has prospered mainly because it has recognized its responsibilities to the community. It can never fail to prosper so long as its leaders and its servants are permeated by this spirit." We of the Canadian Medical Association would do well to ponder deeply upon these themes. A.T.B.

Editorial Comments

The Etiology of Pernicious Anæmia

A good deal has been added to the clinical picture of pernicious anæmia since Addison's excellent description of the disease in 1855. We know at the present time that the most characteristic hæmatological findings in the Addisonian anæmia are hyperchromia with macrocytosis. Moreover, there is an almost specific reticulocyte response following the administration of liver, liver extract, or dessicated, defatted, hog stomach (ventriculin). Whereas much effort had been expended in the elucidation of the etiology of pernicious anæmia, significant progress in the direction was made only during the last three or four years. And, in this work much credit is due to Castle and his colleagues of the Thorndike Memorial Laboratory, Boston.

Since 1927 Castle has been engaged in working out the hitherto elusive problem bound up with the pathological physiology of pernicious anæmia. Taking into account some old clinical observations, he formulated the hypothesis that the primary defect in pernicious anæmia was to be found in the faulty nature of the gastric juice. In his first series of experiments he demonstrated that during the process of incubation of a mixture of beef muscle and gastric juice recovered from the stomach of normal persons some substance was formed which produced the same effect upon pernicious anæmia patients as did liver. The second step in proving his theory was to show that incubation performed entirely outside the body of beef muscle with human gastric juice, was as effective as the product of the first series of experiments. The third procedure consisted in determining the precise localization of the effective substance produced by the interaction of beef muscle and gastric juice. Castle was able to show that beef muscle by itself was inert, as were also incubated gastric juice, an incubated mixture of hydrochloric acid plus beef muscle, the substance formed by the digestion of beef muscle by pepsin, as well as the product of incubation of beef muscle and normal human duodenal contents. It was found also that the so-called intrinsic factor present in gastric juice was destroyed by heating at a temperature between 70 and 80 degrees C. for one hour. Castle therefore concludes that the intrinsic factor is a thermolabile, organic compound, capable of acting in neutral solution, and producing with the extrinsic factor (beef muscle protein in these experiments) a substance which is a hæmatopoietic stimulant in pernicious anæmia. It is this entity which is deficient or absent in Addison's anæmia. The final link in the chain of evidence was provided by showing that the intrinsic factor was missing in the gastric juice of pernicious anæmia patients. This was demonstrated by incubating the gastric juice of two pernicious anæmia patients with beef muscle, and feeding this to two other patients with the same disease. A reticulocyte response was not obtained.[4]

All this work has been carefully done and adequately controlled in every instance. It represents probably the most significant advance in our knowledge of the etiology of pernicious anæmia made during the seventy-five years that the disease has been known as an entity. However, perhaps the most interesting aspect of the whole subject is the fact that clinical observations were the basis for the initiation of a beautifully executed piece of experimentation. It suggests too, the extreme importance of the value of cooperation between clinician and laboratory worker, as only under such circumstances can real progress be made.

J. FEIGENBAUM

Retirement of Dr. John Stewart as Dean of Dalhousie Medical School

The most notable figure in the medical life of Nova Scotia for fifty years, Dr. John Stewart, has asked the Board of Governors of Dalhousie University to accept his resignation as Dean of the Faculty of Medicine. They have done so with great regret. It is not that Dr. Stewart has grown old, although he is approaching his

1. Castle, *Am. J. M. Sc.*, 1929, **178:** 748.
2. Castle and Townsend, *ibid.*, 1929, **178:** 764.
3. Castle, Townsend and Heath, *ibid.*, 1930, **180:** 305.
4. Castle, Heath and Strauss, *ibid.*, 1931, **182:** 741.

eighty-fifth year, but that his physical vigour after many years resents the calls put upon it.

Dr. Stewart was born in the Island of Cape Breton in 1847. His parents later removed to Pictou on the mainland. He began his medical studies at Dalhousie University and completed them at Edinburgh, from which he received his degree. While there he was so fortunate as to win the regard and confidence of the great Lister and was his favourite pupil and became his House Surgeon. He went with Lister to London, and had he remained there one hesitates to surmise to what eminence he would have risen in the realm of surgery in the Old Country. For family reasons, however, after a year in London, consequent upon the death of his father, he returned to his native Province. To it he came as an apostle of the New Antiseptic Surgery, and to its people he has given for more than fifty years the benefit and blessing of his skill and knowledge. Combined with his brilliance in his professional field is a nobility of character and breadth of human qualities that have endeared him to all who have known him personally—and even by those who have not his name is held in reverence. Modest, self-sacrificing and honourable in all things, he has set a standard of life and practice that few in his, or any, calling can emulate.

From the beginning of his career he took a great interest in medical education, and has been for many years associated with the Faculty of Medicine of Dalhousie University, being at present not only its Dean but also the first in seniority of service on the staff of the School.

On the outbreak of the war, at a time when Dr. Stewart was verging on the age when most men think of coming retirement from strenuous life, he volunteered his service in the field, and went over as Commanding Officer of the No. 7 (Dalhousie) Stationary Hospital Unit. On his seventieth birthday anniversary he was honoured by his Sovereign reviewing the Unit in France. He was appointed in March, 1918, Consulting Surgeon at Headquarters. He was made a C.B.E. for his distinguished service.

On his return from overseas Dr. Stewart was appointed Dean of the Faculty of Medicine, and no small share of the great progress of the School since that time is due to his wisdom in its direction, and to his counsel and experience. He not only holds the Honorary Doctorate from Dalhousie, but Edinburgh also conferred that high honour upon him. Recognition of his high standing in the medical world of Canada was made also by his receiving the same degree from McGill University.

Dr. Stewart retires from a long active participation in professional and educational life with every mark of admiration, regard and honour which his fellow countrymen can accord him. His friends wish him many years of happiness in his retirement.*

A. STANLEY MACKENZIE.

The American Association for the Study of Goitre

The attention of the medical profession is specially called to the meeting of the American Association for the Study of Goitre, which takes place this year in Canada, in the city of Hamilton, on June 14, 15 and 16. As will be seen by the perusal of the program for this Congress, which appeared in the April issue of the *Journal*, many of the leading specialists on goitre, both in Canada and the United States, will contribute papers or take part in the discussions. Among the Canadian authorities we note the names of Drs. Roscoe Graham, Fahrni, Eberts, Collip, Oille, Lockwood, Deadman, and Miss Graham. Drs. C. H. Mayo, Lewellys Barker, and G. W. Crile are among those attending from the United States. It is hoped that a large attendance of Canadian medical men will attest to our appreciation of this outstanding opportunity. A.G.N.

The Veterinary Bulletin

We have had occasion before to comment favourably on a new journal, the *Veterinary Bulletin*, which is being published under the auspices of the Imperial Bureau of Animal Health. It is an abstracting journal dealing with current literature and covering the departments of Veterinary Research, Administration, Public Health and Education. The Imperial Agricultural Bureau has an executive council representing various parts of the British Empire—Australia, Canada, England and Wales, Scotland, India, Ireland, New Zealand, South Africa, Southern Rhodesia, and the Colonies, Protectorates, and Mandated Territories. The Canadian representative on the Council is Dr. J. H. Grisdale, of Ottawa.

The *Veterinary Bulletin* has been enlarged and since the beginning of 1931 has been appearing monthly. A wide range of subjects is dealt with, many of them of importance to the practitioner of human medicine and the specialist in public health. We note among these several abstracts dealing with BCG, the control of bovine tuberculosis, *B. abortus*, yellow fever, infectious mastitis, vaccine lymph, anaphylactic shock, besides a number on physiological topics. The increased size of the *Bulletin* no doubt means increased usefulness, and this publication can be confidently recommended to all who require to obtain a broad view of the field of

* The *Journal* also desires to express its high appreciation of Doctor Stewart's life and work and to associate itself with the tribute paid him by Dr. Stanley Mackenzie.

animal health and animal industry, as well as their bearing on human welfare.

The price has had, of course, to be increased and now stands at £2 per annum, or 5s. a copy. Subscriptions should be sent to the Imperial Bureau of Animal Health, Veterinary Laboratory, Weybridge, Surrey, England. A.G.N.

Resolution on the Death of Dr. A. D. Blackader

The following resolution was passed at the last meeting of the Executive Committee of the Editorial Board of the *Canadian Medical Association Journal:*

That the members of this Board desire to place on record their sense of heavy loss in the death of Dr. A. D. Blackader, who was for so long the chief guiding and constructive influence in the life of the *Journal.* It is with this last in mind especially that the Board would pay a tribute to Dr. Blackader; it was not his sole activity or achievement, but it brought to a focus all the many interests with which his life was filled. In it he found an outlet for his tireless mental energy. Nothing in the work ever seemed stale or unimportant to him, for he had a high sense of seriousness, which however was penetrated and vivified by a vein of humour. Perhaps the study of diseases of children had first place with him; certainly he was a pioneer in that branch of medicine; but so wide were his interests, so well balanced his judgment, so clear his grasp of the essential, that he was able to successfully establish a journal which has the support and admiration of every section of the profession.

Few outside of the Board, perhaps, realize how complete was his self-abnegation in the service of the *Journal.* To financial gain or even well deserved return he never gave a thought; to praise of himself he was entirely indifferent. The all-absorbing idea of the last twelve years of his life was the success of the *Journal.* No one obeyed with more complete surrender the exhortation

> "Give all thou canst: high Heaven rejects the lore
> Of nicely calculated less or more".

It was impossible but that those in association with him should gain something from the fineness of his spirit. No one was more anxious than he to nurture and encourage the efforts of others, and many men must be indebted to him for invigoration of their intellectual and professional interests. In spite of increasing physical disabilities he kept to the end his freshness of mind, and his interest in literally everything pertaining to scientific knowledge.

More than all this was his strength of character, his courage and his generosity; he knew how to speak his mind with force and clearness, and he never wavered in his fight for ideals. We have indeed lost from amongst us a true man, of the best type in our country and our profession.

TREATMENT OF ADDISON'S DISEASE WITH AN EXTRACT OF SUPRARENAL CORTEX (CORTIN).—F. A. Hartman, G. W. Thorn, L. M. Lockie, C. W. Greene and B. D. Bowen, report seven cases of Addison's disease treated with cortin. Three represented the severe stages of the disease and four others presented less severe aspects of the syndrome. Conclusive evidence is furnished that an extract of the suprarenal cortex prepared by the ether-alcohol method is effective in alleviating the symptoms of Addison's disease. The requirements of different patients for cortin vary over a wide range, depending no doubt on the degree of suprarenal insufficiency and also on individual variation. It has been found in animals with complete suprarenalectomy that the amount of cortin required to keep them in good condition varies considerably. This variation exists even under optimum conditions, but with infections, trauma and exercise much more cortin is needed. When the requirements are not great, the doses not only are small but need not be given frequently. As the patient's demands for cortin increase, the dosages must be stepped up both in quantity and in frequency, as is necessary, for example, in infections or in trauma. This obtains in animals and seems to be true in man. The daily total requirements both in man and in animals seem to be less if the dosage is frequent.—*J. Am. M. Ass.*, 1932, **98:** 788.

TRANSFORMATION "IN VITRO" OF CAROTENE TO VITAMIN A.—H. S. Olcott and D. C. McCann argue that if the transformation of carotene to vitamin A (demonstrated in rats by T. Moore and N. S. Capper, and in the fowl by Capper) is enzymatic, it should be possible to secure it *in vitro.* Preliminary experiments indicated that carotene was destroyed and that vitamin A appeared with its characteristic band at 325 $\mu\mu$ in the absorption spectra of ether extracts of such mixtures. Following up this work, the present authors describe their later investigations, which, they claim, have verified the supposition of an enzyme being responsible. The livers of rats which had ceased to grow on a vitamin A free diet were examined. A simple ether extract was shown to contain no vitamin A, but when carotene was added and the mixture was incubated for 36 hours, the carotene disappeared and the vitamin A band in the spectrum appeared. When, however, the liver extract was previously boiled for one minute it lost the power to transform carotene. The authors suggest that this enzyme, which is destroyed by heating, should be termed "carotenase."—*Science,* October 23, 1931, p. 414.

Special Articles

A CONFESSION OF FAITH*

BY ALFRED COX, O.B.E., LL.D.,
HON. M.A., M.B.

One of the few advantages of increasing age—in fact, the only advantage that I have been able to discover—is that one finds oneself in possession of a store of memories and experiences into which one can dip, with pleasure to the owner, and perhaps sometimes to the benefit of others. I say perhaps, because I doubt whether anybody really learns from the experience of others—most of us prefer to make our own mistakes. As I am looking forward, with some dismay, to the time when I shall close the long chapter of my official connection with our Association, it seemed to me not inappropriate that I should deliver myself of some of the impressions and lessons left on my mind before the members of the Branch in which I got my first love for the Association, and where I received the training which led me to the office I now hold. I am most grateful for the opportunity.

Although I qualified in 1891, I did not join the Association until 1893, when it was holding its Annual Meeting in Newcastle, for the simple but sufficient reason that I could not afford the subscription earlier, and found it difficult to do so even then. A young practitioner without capital, trying to build up a practice in a poor industrial town, had to look twice at even 25s. (which was the subscription at that time) before parting with it; the 'nineties were a hard time for such a man. In every industrial town, and especially in the North, the profession was suffering from internal competition, little mitigated by sentimental scruples about ethics or etiquette, and from sweated contract practice. Our Association had taken little interest in the economic affairs of its individual members, and indeed was not so constituted that it could do anything effective. Moreover, those of us who had the temerity to hint at the possibility of the Association taking a hand in dealing with such sordid affairs were regarded as revolutionaries, or, at least, as not quite respectable innovators. When I am told, as I sometimes am, of the "good old days when the profession *was* a profession, Sir, and not a trade unfit for a gentleman," I think of the many men I knew to whom professional life was sheer drudgery—cheap practice, wretchedly paid midwifery, and bad debts, with consequent inability to keep up a decent standard of life or to educate children properly. That golden medical age must be a very long time ago, for as far back as 1699 Samuel Garth, the doctor poet, wrote:

> "How sickening Physic hangs her pensive head,
> And what was once a Science, now's a Trade."

We have seen many changes in professional life during the last forty years. One is apt to think of the days when one was young as being a halcyon time; hardships and discomforts seen in retrospect seem insignificant compared with the advantage of being young. But there can be no shadow of doubt that the medical man as a labourer worthy of his hire, as a member of a learned profession, as a useful and valued citizen, stands in a far better position to-day than he ever did. His average income is higher, his status in the community is higher, and his self-respect is higher. In the 'nineties' the average medical income was estimated at less than £500 a year. The doctor in an industrial area who owned a means of conveyance was the exception. The doctor who walked his rounds now would be regarded as a freak or a failure. The exploitation of doctors by medical aid associations (now comparatively rare and much curtailed) and by friendly societies was of a nature which the present generation cannot conceive. The medical aid associations employing doctors were frequently run by acute commercial men who usually offered some kind of a bribe in order to get members. Canvassing and touting of various kinds were rampant, and for friendly society appointments it was not uncommon to have a sort of "Dutch auction" among the local doctors.

Those who have a taste for dipping into antiquity should read *The Battle of the Clubs*, published in 1896 and now long out of print, wherein the special correspondent of the *Lancet*, Mr. Adolph Smith, to whose memory I am glad once more to pay tribute, did splendid work in exposing this state of things and arousing the attention both of the public and of the General Medical Council. We have changed all that, and when I say "we" I mean our Association. The worst evils of contract practice have been abolished; medical men and women have been taught that it is not only permissible but a duty to themselves and their families that they should combine to look after their own interests. In fact, the greatest change in the last forty years is the prominent position which economics now occupies in the affairs of our profession, as in other walks of life.

Since the reconstitution of the British Medical Association in 1902, the profession has had an organization which is able and willing to ascertain its collective views and to carry out its wishes in so far as this can be done with due regard to the general public interest. I lay stress on this proviso because (as you will readily concede if you apply the same test to any other profession or

*An Address given before the North of England Branch, at Newcastle-on-Tyne, on February 18th, 1932. Reprinted, somewhat abridged, from the *Brit. M. J.*, 1932, 1: Supp. p. 93.

trade) it would be a bad thing for the community if any particular section were able to get all its own way. Syndicalism is a form of organization which every good citizen resents in his heart, whether it comes from trade unions, a priesthood, or a profession. All that any section of the community can claim is that its views shall be heard when its interests are affected, and that it shall have fair play.

I think it is true to say that in the last thirty years our Association has attained such a position that no Government is likely to introduce legislation affecting the medical profession without consulting us beforehand and giving serious consideration to any proposals we may make. This position was secured as a result of the fght which ensued on the introduction of the National Health Insurance Bill in 1911. That event found the British Medical Association in the possession of machinery which had never really been tested, and its trial was a severe one, because we found, to our great surprise, that we were a main factor in one of the hottest political struggles of our time. The fight might easily have broken us, but in fact it made us. There are still many left who remember it, and who recollect the reactions of some of our members who were disappointed that we had not achieved all that we had set out to win, forgetting that nobody ever gets all he wants; but we came through with a score of three-quarters of our points, and with a fine nucleus of trained medical politicians.

Temporarily we lost a considerable number of those who had joined for the fight and who left the rest of us to consolidate the position they had helped us to win. But in the course of a year or so a rather disconcerted and depressed Association found that its first big fight in the political arena had taught it a great deal, and had transformed an enthusiastic but over-sanguine and untrained body into a really formidable organization, with a much more sober view as to the possibilities of action. The protagonist of the Insurance Bill, Mr. Lloyd George, paid us many compliments as a fighting organization. On one occasion he said (apropos of attempts made by other organizations to enter into the fight): "As everyone knows who has had to do with a profession or any other combination where there is a dispute as to terms or conditions of labour, it is infinitely better you should deal with a united body than with a number of sporadic and conflicting interests." The Association had achieved the position, still unchallenged, of being the only body in this country that could be regarded as speaking for the medical profession as a whole. We have kept that position by hard work, and also by statesmanship, which means, colloquially speaking, that we have always been willing to listen to the other fellow's case, and have recognized that, although we exist primarily to protect the interests of our members, yet our members themselves exist for the good of the public they serve; and further, we gained the reputation, of which I am proud, of being a body capable of making itself awkward if disturbed unnecessarily, but one which, when it makes a bargain, can be trusted to keep it.

I have always loved a fight, but I like to feel I have a good cause to fight for, and there have been times when I wasn't altogether sure that our case was of the best. These are the occasions when one is tempted to use bluster instead of reasoning; but much experience and study of methods of controversy have convinced me that nothing is ever gained by it. The line I prefer has always been that of judicious understatement—so much more effective, both in point of style and of results. The greatest compliment that has ever been paid to me in my official career came from an angry correspondent, a very pugnacious gentleman, who wound up a lurid prophecy as to my ultimate destination by saying, "You are too damned reasonable!" I am glad to think that our Association is a reasonable body, always ready to consider the arguments of the other side, though fully conscious of the strength of its own, and ready to compromise when compromise is necessary—as it generally is. Compromise is regarded by some as the last resort of the feeble-minded; but I have always thought the words of Burke on this subject were very sagacious: "All government, indeed every human benefit and enjoyment, every virtue, and every prudent act, is founded on compromise. We balance inconveniences: we give and take: we remit some rights that we may enjoy others."

One of the great controversies inside the Association during my secretaryship raged pretty acutely during several years over the question whether we ought to become a trade union. We are often told by people in the press and in Parliament, some of whom intend to pay us a compliment, and others to be disagreeable, that the Association is "the strongest trade union in the country". If that means, as it is often intended to mean, that we are a vigorous and well-organized body, which does its best to protect the lawful interests of its members, then we accept the compliment, but when it is meant to imply that we adopt illegitimate or unsocial means for imposing our will arbitrarily on the community we "deny the allegation and spurn the allegator". During this controversy we were told by some ardent but misguided persons that no organization could ever be successful in protecting the interests of its members unless it were a legally recognized trade union, adopting the methods of the industrial trade unions—levies, strikes, picketing, etc. This assertion has so often been proved false by events that it needs no argument now. The Association, in my opinion, has won its victories and attained its present position just because it is not, and never can be in the legal sense, a trade union. It could not employ the methods of the industrial trade unions for many reasons, but mainly because it consists of men and women dedicated in a peculiar sense to the service of the com-

munity. So long as this is the living tradition of our profession, so long shall we enjoy that respect and trust which is extended to us as it is to no other body of men and women. When our profession betrays that tradition and becomes a mere money-making trade, then and then only could we become a trade union, and that day will see our downfall. Ours is not a trade; there is a vast difference between the civility due from every tradesman to a customer, and that absorbing interest and devotion which every good doctor bestows on his patients. St. Loe Strachey, the great editor of the *Spectator* said in his reminiscences.

"I say without the slightest fear that I may be overstating my case, that there is no profession which is more exposed to the temptation to forget honour, humanity, and kindliness than the medical profession, and none in which the exploitation of human suffering is easier. Yet there is none in which the temptation is so triumphantly withstood. Let this be remembered by the public when they are inclined to sneer at medical etiquette and to speak of it as if it were a code for maintaining selfishness and enrichment. It is the one thing that stands between him and the dangers of exploitation. It is what makes him and his sufferings hold the dominant part in the dread dramas of pathology."

The fundamental article of faith of the doctor, as I have always understood it, and as it was instilled into me as an assistant and in the medical school of the University of Durham, is that the interests of the patient must always come first; or, to put it in another way, a doctor should treat every patient as he would wish himself or one of his family to be treated. This is so simple to enunciate, but so difficult for a harassed doctor always to put into practice, as I realize when I think of my many failures to keep the faith during the twenty years I was in practice. But every man and every body of men must have an ideal to live up to, and this is ours. It is the belief that I have been working for a body of men whose lives are dedicated to this faith that has made me so proud of the office I hold, and so anxious not to do anything which would lower the prestige of the profession. As for those who deliberately or weakly adopt the more superficially attractive paths of commercialism, one can only say that they have mistaken their vocation, and can charitably hope that when making up their accounts with their conscience, they will feel it had been better that they had made their money by honest pawnbroking or the selling of soap, or straightforward burglary, than by fouling the nest of an honourable profession.

One of the best things our Association has done has been the cultivation in its members of the habit of regular contact, whether for discussion of cases, or medico-political matters, or for purely social functions such as dinners, dances—even cards or golf. The effect of contact is always good, and it is a great satisfaction to me to know that almost every day our Divisions all over the world are meeting and cultivating this spirit of camaraderie. We can safely estimate that for every man who was interested in the Association thirty years ago there are at least ten to-day.

A development of outstanding importance is the position of the Public Health Service; it illustrates the gradual emergence of a new section of the profession, and the methods by which the Association has recognized and dealt with it.

When I first began my connection with the profession there were very few medical officers of health, and most of them were part-time officers. Now the part-time man is disappearing, and a great Public Health Service is in operation all over the counry, employing a large number of medical men and women. There was a tendency for this service to regard itself as a separate community, expecting little sympathy or help from the rest of the profession. Indeed, it is not an exaggeration to say that in many areas there was a distinct coolness between the general practitioner and the Medical Officer of Health—a coolness which has not entirely disappeared. During the past ten years our Association has done much to promote a better feeling, and a realization that the Medical Officer of Health is, after all, a man and a brother, no more and no less human, and therefore no more and no less liable to err, than the practitioner, and that he can be very awkward or very helpful to the rest of the medical community according to the way he is handled. The Association has helped to improve his financial outlook and status, and our relations with the organized group are gradually removing any dangers of separate, and therefore potentially dangerous, medico-political action.

I could gladly spend much time in talking about some of the great men with whom I have been brought into intimate contact, but time is short. It would be invidious to speak of the living, but, whatever the limitations, I must speak of one or two of the great figures of the past, because of their influence on me and, directly or indirectly, on our Association.

First comes Horsley, the combative and sometimes even truculent genius, who did not suffer fools either gladly or otherwise. I doubt whether he ever went out of his way to placate anybody; he achieved his results by sheer mental ability and driving force, and because he knew what he wanted and was determined to get it. With the exception of our Founder, no man, in my opinion, has left such an impress upon the constitution and aims of our Association. He was the outstanding figure in the reorganization of the Association in 1900-3, and the first Chairman of the Representative Body. He impressed on me, as he did on everybody, the necessity for an orderly constitution, and for the rigours of debate; and he had great ideals as to the proper place of our Association in the councils of the nation. Nobody was more ready than he to stand up for the under-dog in the profession,

and to see that he had his rights. Would that more men in the consulting ranks would follow his example! He realized that in order to do the best for its members the Association must take its proper place in public affairs. He certainly did more than any other single man to transform our Association from an oligarchy into a democratic body. Horsley was a great believer in the doctrine that a really useful professional organization "should get its blow in first"; that as it knew more, or ought to know more, of the medical needs of the community than anybody else, it should not wait for the politician to make the first move, but should put up constructive proposals which, whether adopted or not, would tend to lead the thoughts of the public along the right paths, in anticipation of political action. This is sound doctrine, which has for many years been practised by our Association, sometimes to the displeasure of the less far-seeing of our members. Two outstanding instances occur to my mind—our Hospital Policy, and the Proposals for a Medical Service for the Nation.

Another great formative influence in my official life was Sir Robert Morant, the first chairman of the National Health Insurance Commission, and the ablest public servant I have ever known. He was ruthless in his determination to get things done, and, indeed, he might be excused, for he had one of the most difficult tasks ever given to a civil servant. Not only had he to find and set to work the staff necessary for this great new department, but he had to clear up the mess made for him by politicians. He taught me—through tribulation, for my first contacts with him were painful—a sense of proportion. He made me realize that, although we were a very important factor in the new orientation of health affairs, which started with the medical inspection of school children and was carried on by the insurance system, we could only get our ideas adopted by adapting them to other factors in the political situation.

Then there was Sir Clifford Allbutt—a courtly, cultured physician, who, at the time I knew him well, was an older man than I am now, of international fame, and with every temptation to devote himself quietly and comfortably to his congenial work at Cambridge. With a mind always open to new ideas, and a great belief in our Association, he strengthened my faith in it by his idealism, and particularly by his advocacy of a view I have always held—namely, that an organization to be of any use to any one section of the profession must be able to command the support and the advice of all the other sections. There are specialists and consultants who profess to have no use for such a body as ours; they do not see that it can help them, and they are not altruistic enough to come in and help others as a duty to their profession. Allbutt always held strongly to the Baconian tenet that "every man is a debtor to his profession." He perceived that as the State goes on extending its provision and control of medical service, so all sections of the profession must be drawn in, whether they like it or not. He saw the danger of a too narrow outlook which is encouraged by specialization; he saw that the specialist needed contact with men working in other professional spheres, just as the insurance practitioner needed the help and the criticism of the man who was not directly concerned. I am certain this is sound, and that our plan of including on committees men not directly concerned in the subject under consideration is good for all concerned. Indeed, I am often inclined to think that it would be an advantage to have one or two friendly but critical laymen on all our committees dealing with affairs which concern the public. I am sure we should save ourselves from many errors, and we should ascertain, before we had committed ourselves, the effect of our proposals on the public. "Try it on the dog" is a good working policy.

I have had a long and, on the whole, a happy British Medical Association life, doing just the work I would rather have done than anything else in the world; happy in my relations with the leaders of the Association; very happy and fortunate in my colleagues in the office, and, most of all, in my relations with that devoted band who do our work at the periphery. I trust they will accept this message from a very grateful man. I firmly believe the medical profession contains some of the finest men and women in the country, for I have met them and worked with them. I know of their unassuming and self-sacrificing work for their patients, and I know even better of their self-sacrifice on behalf of the Association. There must be something fine in an Association which can command the devoted service of a constant stream of the best men and women in our profession. I think it is because they believe that our Association is an essential factor in the public service; that it tries to give to public affairs just the same kind of honest service that the good individual doctor tries to give his patients; and that we, as individuals, competent as we may be to deal with individuals, need a body which welds us together as a corporation, and inspires a pride in our profession and a determination to make ourselves worthier of it. I cannot put it better than my late colleague Dawson Williams, a great editor and a big man in every sense of the word. He was describing the view of the Association which had been taught him by his predecessor, Ernest Hart, who said he "held fast by the view that if the profession was to maintain and improve its place in the public estimation, it must constantly strive to increase the efficiency of its services to the public, when other things would be added to it."

The Association has now the prestige of age as well as a great record of work done. It has a building the beauty of which insensibly instils pride of possession into all who visit it, and who, if they are sentimentally inclined, will look with pride on those flags and trophies from all parts of the Empire which bear witness to the affection of thousands of members who have never been

inside the House, but who regard it as a standing memorial to the generations of medical practitioners whose loyalty to the Association has made such a worthy home possible. I shall leave the Association proud of the part I have been permitted to take in an eventful period of its history, proud of the many friends I have made while in its service, and certain that its future will be worthy of its Founder, and of the wonderful voluntary service that has been given to it by five generations of the best of our profession. It has prospered mainly because it has recognized its responsibilities to the community. It can never fail to prosper so long as its leaders and its servants are permeated by this spirit.

Men and Books

THE MEDICAL HISTORY OF BRITISH COLUMBIA*

BY A. S. MONRO, M.D.,

Vancouver

THE PERIOD OF MODERN TRANSPORTATION AND INDUSTRIAL DEVELOPMENT (1880 TO 1910)

With the completion of the transcontinental railway there came an influx of new population, also a development of the mining industry in the southern part of the province which, in turn, brought about the opening up of numerous small centres of population in this territory. There had also arisen at that time a rival to Victoria, hitherto supreme as the largest city and capital of the province, in the city of Vancouver, today the commercial capital of British Columbia. The expansion that commenced at this period and the probability of its rapid extension as time went on was, no doubt, a factor in the steps taken by the medical men of Victoria at that time to organize and unite under the aegis of a provincial society. At a meeting held in Victoria, on January 15, 1885, the following practitioners, Drs. J. C. Davie, Matthews, Rowbotham, Jackson, Milne, Dearden, Harrison, and J. D. Helmcken, met for the purpose of forming a medical society. By unanimous vote it was decided to name the new organization the "British Columbia Medical Society." Invitations were sent out to all practitioners, about thirty-five men, in the province to become members. The first officers elected were, *President,* Hon. J. S. Helmcken; *Vice-president,* Dr. Rowbotham; *Secretary and Treasurer,* Dr. J. D. Helmcken. Dr. G. L. Milne, of Victoria, is the sole survivor of this group.

At the next meeting of the Society, on January 21, 1885, a committee was appointed to "frame regulations and the Constitution of the Society, and to draft an Act to regulate the laws governing the medical profession of British Columbia." The work of the Committee was brought to a successful conclusion when, on April 6, 1886, the Provincial Legislature passed "An Act respecting the Profession of Medicine and Surgery."

The Report of the Registrar of the British Columbia Medical Council shows thirty-nine names registered in 1886, of which number, Dr. G. L. Milne, of Victoria, and Dr. W. A. D. Smith, of New Westminster, are the only members now living.

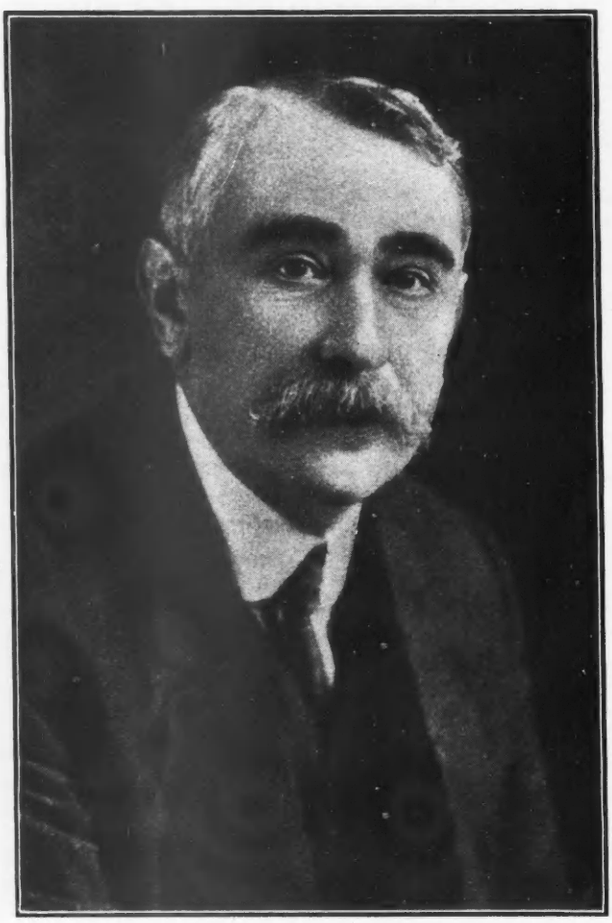
THE DEVELOPMENT OF PUBLIC HEALTH CONTROL IN BRITISH COLUMBIA

As early as 1869 it was deemed advisable to have some legislative machinery to work with. Accordingly, in that year was passed, "An ordinance for promoting the Public Health in the Colony of British Columbia," which empowered the Governor-in-Council to create Health Districts, establish local Boards of Health, define the duties and jurisdiction of these Boards, with the proper method of enforcing their rules by fines and imprisonment. There was also special provision for the appointment of an extraordinary officer, to be called the Health Officer, to act during extraordinary crises such as serious epidemics "whose duties it shall be to provide that the Local Boards carry out the orders in Council." In municipalities, the Council of the municipality constituted the Local Board, while in unorganized districts the Government Agent of the district acted.

The ordinance was very imperfect, but still served its purpose until the first stress came in a small-pox epidemic in 1892. To combat this, Dr. J. C. Davie was appointed Health Officer, and by his efforts the storm was passed. But the need of better legislation was obvious. Accordingly, in the following year the "Health Act, 1893" was passed. As the epidemic had subsided, the Act was not at once put in force. However, later on, there was an outbreak of cholera in Japan which spread over into Honolulu. As this was getting near home, the Government, on September 26, 1895, proclaimed the Act, whereupon it came into force. This

* Previous instalments of this article can be found in the *Journal,* 1931, **25:** 336 and 470; 1932, **26:** 88, 225, 345 and 601.

Act called for the creation of a central board with very extensive powers. The board appointed consisted of Dr. J. C. Davie, Chairman, Drs. J. M. Lefevre, R. E. Walker, L. T. Davis, and Geo. H. Duncan, who was the Secretary. It at once commenced the work of organization. It prepared regulations regarding smallpox, scarlet fever and diphtheria, and supplemented them by a well digested pamphlet on disinfection. The regulations embodied provisions for the enforcement of modern methods of isolation and quarantine, disinfection, and vaccination, etc. They provided also for the appointment of medical and other health officers, and establishment of isolation hospitals and suspect stations. A serious outbreak of typhoid in the Kootenays in 1896 proved the value of the new order of things. Dr. A. T. Watt, who was the Secretary, toured the infected district, and on his return, Clive Phillips-Wolley was appointed as a special officer to see that the provisions of the Board were carried out. Some of the regulations at this time were impossible to carry out and so gave rise to considerable dissatisfaction. Sandon was prohibited from using the only water supply available and from disposing of its sewage into the only place which nature had provided; Rossland was treated much the same way. Later on, when the Semlin Government came into power, the Board was abolished. Health matters came under the jurisdiction of the Attorney-General; the Lieutenant-Governor-in-Council became the Board of Health, and Dr. C. J. Fagan was appointed Secretary and practically Chief Executive Officer. Those who knew Dr. Fagan will remember him as a man of large build, of a genial, optimistic temperament, and earnest in his work.



Charles Joseph Fagan

The campaign against tuberculosis in the province owes its origin practically to Dr. Fagan, and without his Irish fighting spirit the Sanitarium at Tranquille would not have been built. In this connection the names of Drs. A. P. Proctor and R. E. Walker deserve more than honourable mention, and the former continues to give his active support to the good work whenever the opportunity affords. We are indebted to Mrs. Alice Fagan, of Victoria, for the following brief biography of her late husband.

"Dr. Charles Joseph Fagan was born at 'Lismacaffrey', County West Meath, Ireland, on May 31, 1857. A Roman Catholic in religion, his early schooling was with the Vincentian Fathers at Castleknock, where he excelled at games, was champion runner of the school, and a keen cricketer. His professional education was obtained at Trinity College, Dublin, where he took the Degrees of B.A., M.B., B.Ch., in 1883. He practised for a time in Staffordshire, England, and then was induced by the Rev. Father Norris to come with him to New Westminster as Medical Superintendent of St. Mary's Hospital, which had lately been built there. Later, he and Dr. R. Eden Walker were together for many years. They parted when he was appointed secretary to the Provincial Board of Health in November, 1899. He held this position until forced by continued ill-health to resign, in November, 1914.

"Dr. Fagan was known to every medical man of the province, as, for fourteen years, he held the position of Registrar to the Medical Council, doing much to raise the tone of the profession. During his tenure of office he brought many valuable ideas into play, one notable improvement being the regulating of the salmon fishing industry by supervising the class of persons engaged in the canneries and seeing that the fish were packed under sanitary conditions.

"The service for which he will perhaps be best remembered, and in which he never spared himself, was the establishing of the Anti-Tuberculosis Society, and, later, the sanatorium

at Tranquille in the early days of the fight against the 'Great White Plague,' and under great difficulties, which in itself will ever remain a monument to his memory. He did not long survive his retirement and died at Victoria on February 10, 1915.

"He was married to Alice Clute at New Westminster on August 2, 1893."

THE KOOTENAYS

The last decade of the nineteenth century witnessed an extensive mining and railway development in the southern part of the province. Important centres sprang up rapidly, and these were linked together by an excellent transportation system. The towns of Nelson, Rossland, Trail, Grand Forks, Greenwood, Phoenix, Kaslo, Sandon, Nakusp, New Denver, Fernie and Cranbrook had their beginnings in this period. In the far northern part of the province, just below the 60th parallel, the town of Atlin came into existence in 1899, and for a short time enjoyed a hectic prosperity and boasted a cosmopolitan population of five or six thousand people. As was to be expected, medical men found their way to these new towns, some arriving before the advent of the railways, of which the two most important were the Columbia and Western and the B.C. Southern (Crow's Nest Pass Line), while others came as medical officers on railroad construction and later settled in the new towns along the railway. In collecting data of the early medical men of the Kootenays the writer has had invaluable assistance from Dr. E. C. Arthur, Medical Officer of Health and School Medical Inspector of Nelson. Dr. Arthur has done his work most thoroughly and has included in his account practically every man who ever practised in that district.

As it is not the purpose of the writer of this narrative to deal with the living but rather to call to memory some of those who have passed on or who have left the province, mention will only be made of those who come within the latter category.

To quote Dr. Arthur.—

"While Dr. Labau was in the district before I came, he did not register until May, 1892, and I believe that from May to November, 1891, I was the only registered practitioner south of the main line of the C.P.R., from Crow's Nest to the Hope Mountains.

"Dr. Labau was a licensed practitioner in Nelson from May, 1892, until sometime in 1907, when he removed to Spokane, Wash. He there practised some years and then removed to Victoria, B.C., where he practised until his death in 1921. In his later years in Nelson he had several partners who will be mentioned later, but he and I were the only practitioners in Nelson from September, 1892, until Dr. Symonds came in 1896.

"Dr. J. R. Williams, M.R.C.S., Eng., and L.R.C.P., Lond., 1890, registered, May 5, 1891. With his family he arrived in Nelson from Seattle on November 26, 1891, and remained until September, 1892, when he removed to Ashcroft, B.C. How long he remained there I do not know, but my remembrance is that he removed from there to some place in southern Alberta, where he was reported to have died some years ago. During his stay in Nelson, Dr. Williams and I were always friendly and worked in harmonious competition for practice which was insufficient for one.

"The need of hospital accommodation had already made itself felt, and the first steps towards meeting this want were taken on Saturday evening, January 23, 1892, when Dr. Williams, Mr. G. O. Buchanan and I met in my house and spent the evening in discussing the question and formulating tentative plans for establishing a hospital at Nelson to supply the needs of Nelson and the surrounding district. We next placed the matter before John Houston, editor of the *Nelson Miner*. Houston took an active interest in the matter, and called meetings at which committees were appointed to carry out different branches of the work.

"The Kootenay Lake General Hospital Society was incorporated under the Benevolent Societies Act. A constitution based largely upon that of the Royal Jubilee Hospital of Victoria was framed. The Society was formed of citizens who paid an annual membership fee of ten dollars, in return for which they were qualified to vote at elections of officers and entitled to free hospital treatment during that year. The first Board of Directors was elected on May 20, 1893.

"A small building of two storeys was erected during that year and it was hastily opened on December 23rd to admit John Cameron, a deck hand on the *S.S. Nelson*, who had sustained a simple fracture of the left tibia and fibula. He made a good recovery and returned to work, but neither the bill of the hospital nor mine for professional services was ever paid.

"I shall here introduce the subject of contract medical practice as it existed for many years in this section of the province. There were very many cases like the one quoted above of men who earned good wages, but spent them mostly on wine and women, with the result that when sickness or accident befell them, the medical attendant received little or nothing for his services. This led medical men to enter into contracts with employers of labour to render all necessary medical and surgical attendance and hospital care to the employees in return for a monthly fee, usually of one dollar, which was deducted from the payroll by the employer, and by him paid to the medical man. These contracts usually covered sickness and

accident sustained while upon the work, but excepted venereal diseases, injuries received when not at work, and treatment requiring the services of specialists. The medical man attended at the camp when called and kept a small supply of simple remedies and dressings there for use in his absence. If the camp were not too inaccessible the physician usually made a visit once or twice a month, to see that all was going well. Under this system the men received some attention, the physician had some small remuneration, and the employer was relieved of a certain amount of responsibility. Where large numbers of men were employed as upon railway construction or large mining operations the physician usually profited, but small operations were usually unprofitable and sometimes the source of loss. Under the system abuses arose. For instance, on large railway construction the man who had the contract, or in some cases the railway company, employed other physicians on salary to do the medical and surgical work on allotted sections of the road under construction. Sometimes these physicians, through drink or other cause, shamefully neglected the men under their care. The construction of the Crow's Nest Railway caused so many complaints that a Royal Commission was sent from the east to investigate. Not long after that time legislation was passed in this province whereby the employees were given the right to select the physician to whom their fees would be paid, with the result that on large construction work near cities it was common to see several physicians attending men upon the same work.

"The Kootenay Lake General Hospital from very early days had considerable competition from small hospitals privately owned and operated by nurses or physicians. Probably this was due to the fact that the first Board put in charge a woman who was not a competent nurse. Be that as it may, the Kootenay Lake General Hospital, like most similar institutions, had difficulty in financing its operations, small as they were, and in 1898-99 the Board decided to enter into competition with the medical men of the city in taking contracts to supply treatment for the employees of companies. The medical men protested and were told that the Board refused to be dictated to by the physicians. (I still have the Board's letter). When the hospital undertook contract work it became necessary to have a physician resident on the premises. Dr. W. O. Rose was the first, from August, 1899, retaining the position for eight months before he settled in private practice.

"Geo. H. H. Symonds, M.B. (Edin., 1884), M.D. (Edin., 1892), registered on October 16, 1893. Dr. Symonds was a naval surgeon on the Pacific Station, I believe on *H.M.S. Drake*. He located in Nelson early in 1896 and practised here some three or four years when he returned to England, married, and had a family of four boys, the eldest of whom had died not very long before I visited him at his home in his native city of Hereford in June, 1919.

"One of the early practitioners of this period also was Dr. Herman F. Titus (M.D., Harvard 1890), registered in British Columbia in May, 1893. Dr. Titus had the contract for the medical and surgical work on construction of the Nelson and Fort Sheppard Railway, 1893. He had a temporary hospital in Nelson on the west side of Stanley Street at about Block 23. After leaving Nelson he located in Seattle, where he was last heard of many years ago.

"Among the pioneer practitioners of Nelson was Dr. Isabel D. Arthur, M.D. (Univ. of Oregon, 1897), registered on May 7, 1897. She practised in Nelson from May, 1897 to 1923, in August of which year she died of cerebral hæmorrhage while visiting relatives in Orillia, Ontario."

"Dr. John O. W. Malloch, M.B. (Tor. 1896), practised for a short time in Nelson (1898) before removing to Revelstoke where he remained for a year or more and then returned to Toronto. The writer had the pleasure of meeting him on several occasions—in London, 1905, when he was studying for the English Fellowship and, later, at Salonika, in 1915. He was recognized by his confrères as a most capable surgeon, a diligent worker, and was well liked by all who knew him. His untimely passing a few years ago, after the close of the war, was much regretted by a host of friends.

KASLO

"J. F. Bruce Rogers, M.D., C.M. (Trinity University, Toronto, 1889), registered on May 4, 1893. He located in Kaslo early in 1893 and practised there until 1903, or possibly till 1904, when he returned to Ontario and, I believe, is now practising at Port Burwell, Ontario. Dr. Rogers has to his credit, I believe, the first ovariectomy performed in this section of the province. There was no hospital in Kaslo at the time, hence the operation had to be performed in a room prepared in a private house, January 12, 1895. I was his assistant and a drug clerk was anæsthetist. Circumstances combined to make the operation long and tiring. Gauze sponges had not come into general use in those days, hence, we had a limited number of regulation surgical sponges. The contents of the cyst were too viscous to flow through the tube of our only trocar, which was a small one. For tying the pedicle, which was a large one, he had the only kangaroo tendon nearer than Spokane which was more than two hundred miles distant. In his efforts to tie the unusually large pedicle very tightly he broke it. Fortunately, the one

end was long enough to use, the operation was safely completed, and the patient made a good recovery. In later years Dr. Rogers established and operated a small private hospital of some six or eight beds capacity.

"Dr. Samuel A. Metherell, the first man to be registered in British Columbia on his Imperial registration, was registered 'by order of the Court', February 7, 1893. I think he came to Kaslo very shortly after Dr. Rogers, and later in the same year he worked with Dr. H. F. Titus under the medical contract covering the men who constructed the Nelson & Fort Sheppard Railway, which was built that year. When he left that work Dr. Metherell disappeared and I have never heard of him since.

"Dr. N. W. Bruner (M.D., American Medical College, St. Louis, 1891), registered on May 4, 1893. He had an office in Kaslo till about midsummer 1893; he then removed to Sandon, B.C., where he practised till 1898 or 1899, when he removed to Dawson City, Yukon; there I lost all trace of him.

"Dr. Gilbert Hartin (M.D., C.M., McGill, 1896), registered on May 6, 1896. He came from near Ottawa, and located in Kaslo in May, 1896, where he practised until 1907, when he removed to Nelson and entered partnership with Dr. G. A. B. Hall. In September 1908, Drs. W. O. Rose and Hartin entered into partnership, and bought the practise of Dr. G. A. B. Hall. This partnership endured till the death of Dr. Hartin in February, 1921."

ROSSLAND

Rossland in its heyday was one of the best known mining camps in America. The Le Roi, War Eagle, and Center Star mines made it famous, and it was only natural that medical men should be attracted to this promising new centre of wealth. Many of these were possessed of qualifications and training more befitting a practise in a metropolitan city or university teaching school than a rude mining camp. Such a one was Dr. Harold D. Senior (F.R.C.S., Eng., 1895), registered May, 1897. Dr. Senior will be remembered by many men of that day as a man of high professional attainments, but after a comparatively short residence in Rossland he transferred his activities to Philadelphia where he has, for many years, been connected with the medical department of the University of Pennsylvania.

"Dr. Angus W. Kenning (M.D., Detroit School of Medicine, 1895), commenced practice in Rossland about 1897, and was for many years one of its most prominent surgeons. For a time he was in partnership with Dr. E. J. Bowes, another well known medical man of Rossland, until the latter removed to Nevada at the time of the Tonapah gold fields excitement. Dr. Kenning later removed to Victoria (1911) where he soon enjoyed an extensive practice. He was on the staff of both the Jubilee and St. Joseph's Hospitals and was also prominently identified with the Victoria Medical Society. His death occurred on August 21, 1922. The writer had the pleasure of meeting Dr. Kenning in 1897. The high estimate of his character and professional ability formed at that time remained unchanged during the subsequent years—up to his untimely passing. Dr. Gordon C. Kenning and Dr. Stuart G. Kenning, his sons, are well known in Victoria, where they have been engaged in practice for a number of years.

"The first resident physician in Rossland was Dr. H. L. A. Kellar, (M.R.C.S., L.R.C.P., Eng., 1892), registered on January 10, 1895. He told me that he was an Oxford man in Arts, of London University in Medicine, and had practical charge of a large children's hospital in London for a year before coming to Canada. Dr. Kellar and I went together to Rossland in February 1895, with the intention of entering into partnership and locating in that city. I remained a month and then returned to Nelson. He continued to practice in Rossland until about 1897 when he removed to Ymir, being the first resident physician in that town. He practised there some three or four years and established and operated a small private hospital. Later, upon leaving Ymir he practised a short time in Nelson, after which he moved to Kelowna, where he died some years ago."

Rossland old-timers will readily recall the names of Dr. Robert Reddick, who came to Rossland in 1897, and after a short residence there, returned to Ontario; also Dr. Duncan D. Campbell, who practised in Rossland for a short time, and Dr. Alexander Forin, who was one of the early Rossland men and came there in 1897. Dr. Forin later removed to Nelson and was in partnership for a short time with Dr. Labau. In the early years of the present century he removed to Edmonton. Dr. A. C. Sinclair (Victoria University, Toronto, 1863), registered in B.C., 1897, after three or four years' practice in Rossland returned to Ontario where he passed away many years ago.

One of the first women to practice medicine in British Columbia was Dr. Annie Verth Jones (M.D., C.M., Trinity University, 1896). Dr. Jones practised in Rossland from 1897 to about 1904 or 1905, when she removed to Nelson. She left the province ten years ago or more.

NEW DENVER

Dr. J. E. Brouse (M.D., C.M., McGill Univ., 1892), registered on May 4, 1893. Dr. Brouse was a son of Senator Dr. Brouse of Brockville, Ontario. He had the medical contract on the construction of the Nakusp and Slocan Railway between Nakusp and Three Forks, B.C. This line was finished in the late autumn of 1894. Either that year or early in 1895 he located in

New Denver, where he practised many years before his removal to Vancouver, where he specialized in diseases of the skin till his death a few years ago. Early in his practice in New Denver he established and operated a private hospital which has since been taken over by the community and is now operated as a public hospital.

SANDON

In the latter years of the century just past, Sandon reached the height of its prosperity as a mining centre. Visiting it during the summer of 1897, the recollections of the writer about it are—a humming hive of humanity—a mining camp set down at the bottom of a narrow gulch —its only street about the width of a lane, separating the fronts of the buildings ranged along on each side of it; the rear of the structures backed into the sides of the gulch which rose at a sharp angle on either side. It boasted a medical population at least of three—probably four. Two of these, Dr. G. P. Young and Dr. Pierce H. Power, removed to Vancouver a few years later, while the third, Dr. W. E. Gomm (Bellevue, 1888), remained for a longer period, finally removing to New Denver where he passed away in 1928.

Dr. George P. Young (M.D., C.M., Univ. of Man., 1895), registered in January, 1897, was a brilliant student at medical school and head of his class on graduating, and gave promise of becoming one of the foremost medical men in the city of his adoption. He was a member of staff of the Vancouver General Hospital at the time of his death and his untimely passing (1907), due to an accident, was deeply regretted by his numerous friends.

Dr. P. H. Power, registered in British Columbia in November, 1895, under the Imperial Act, was a retired naval surgeon and practised in Sandon during its boom days for several years. He later removed to Vancouver where he died in the first decade of the present century.

THE BOUNDARY COUNTRY

With the building and completion of the Columbia and Western Railway 1897-99, the towns of Greenwood, Phoenix and Midway sprang into prominence. The mining industry thrived and for a number of years the mineral production supported a very considerable population. During these active years the medical men of the district, although limited in numbers, were generally, men of a high order of professional ability. As mining declined and large producers like the Granby ceased to operate, and with the diminishing population, these practitioners removed to other fields. Several of them, both from the Boundary and from the Kootenay, who came to the Coast in the first decade of the present century, have made an enviable reputation for themselves in their chosen specialties. These will readily recall the railway construction activities of this period and the names of the medical men prominently identified with this class of work.

Dr. Dutton, now of Spokane, was associated with Dr. F. J. Ewing in a number of these enterprises, but as he was not registered in the province, the onus of responsibility in connection with the medical construction fell upon the latter.

"Dr. F. J. Ewing (M.D., C.M., Trin. Univ. Toronto, 1890), registered on May 7, 1897. Dr. Ewing had the contract for the medical and surgical work on construction of the Columbia and Western Railway,—Castlegar to Midway, 1898-99. Large numbers of the men on this work came from construction of the Crow's Nest Pass Railway and many were infected with typhoid fever when they came upon the Columbia and Western work. Dr. Ewing had his headquarters and Hospital at Broklin, B.C. In writing about this Dr. Arthur states, 'I saw in the fall of 1898, at one time, eighty typhoid cases in double decked, double bunks, in two tents and the number of deaths was surprisingly small.' There were some 3,000 men employed on this contract. In 1900 Dr. Ewing had the contract for the medical and surgical work on construction of the C.P.R. branch between Nelson and Proctor. On this work about 1,500 men were employed. During the years 1908 to 1914 Dr. Ewing was in charge of the medical work on construction of the Grand Trunk Pacific, Prince Rupert to Edmonton. On this work some 8,000 men were employed." In 1916 he went overseas and served on the staff of the Quarter-Master General until the close of the war. He then engaged in private practice in Vancouver where he passed away rather suddenly in 1926.

Dr. R. W. Jakes (McGill, 1893), registered in British Columbia in 1895. He was probably the pioneer medical man of the Boundary. He practised for a number of years at Midway and Greenwood. In the early years of the present century he removed to the United States.

The names of Dr. S. S. Oppenheimer and Dr. Ed. R. Northrop will also be familiar to many of the old timers of this section. These men were in the Boundary in the early years of this century, and later removed to Spokane where they engaged in practice and still reside.

Dr. J. D. MacLean (McGill, 1905), registered in B.C. in 1906, practised in Greenwood for a number of years. He represented that constituency in the Provincial House as a private member for a considerable period, was a member of the Cabinet for several years and later, upon the death of the Hon. John Oliver, succeeded him as Premier of the province. Dr. MacLean

for the past few years has made Ottawa his home.

EAST KOOTENAY

We are indebted for the following excellent and very interesting sketch to Dr. F. W. Green, of Cranbrook, one of the pioneer medical men of the district.

"The medical history of East Kootenay is short, but filled with interest and progress. The first record of any medical practice in this district was in the year 1895 when Rev. Father Cocola, O.M.I., then working among the Indians at the Saint Eugene Mission, fitted a log cabin to accommodate four patients. At first these patients were attended by Father Cocola, and later by Dr. Mott who was the first qualified medical man to settle in the country. He was in private practice at Fort Steele. There is no record of any further change in these conditions until two years later when the C.P.R. started constructing their Crow's Nest Branch. Dr. F. W. Mewburn, of Lethbridge, later Professor of Surgery in Alberta University, was made general surgeon of the construction. It was his task to appoint medical men, on a salary to $100.00 per month, for the various construction camps, and at intervals to visit these men and receive reports on their work.

"The first appointments in East Kootenay were given to Dr. Brodie and Dr. Mott, who were stationed at Elko, and apparently attended camps between Crow's Nest and Cranbrook. These men remained with the C.P.R. for no longer than six months, and then, as partners, they went into private practice in Fort Steele, which at that time was the largest and busiest town in the district.

"They were followed by Dr. Gordon and Dr. Philip Roy, but likewise these men did not stay long in the district. Dr. Roy retired to Edmonton and from there he was appointed to the Senate of Canada, and later was made Canadian High Commissioner at Paris. Since then he has been appointed Canadian Minister at Paris. Then, in the early spring of 1898, Dr. J. H. King, now Senator in the Federal Government, came from the east to begin his work as a C.P.R. surgeon between Cranbrook and Elko. A few months later Dr. F. W. Green, coming from the wst, took up the same position in Kuskanook, and patrolled all camps between there and Moyie. During this time Dr. D. Corsan was between Elko and Crow's Nest. Dr. Corsan is still in the district and resides at Fernie. Dr. Bonnell became a Federal member of Parliament, in the Union Government of 1917, and later moved to the coast and is now a C.P.R. surgeon in Vancouver.

"The experiences of these early men were numerous, and in order to give some idea of conditions it would be as well to make mention of a few of the more outstanding incidents. Twice a month the doctors patrolled their sections. This was done on horseback, and meant in some cases a ride of thirty miles a day. As a rule at the end of this journey they found no sleeping accommodation, and they were forced to provide for themselves, usually using their saddles as pillows.

"In the summer of 1898, typhoid swept through the country. The old log hospital at Goat River Crossing was filled with typhoid cases, and the overflow had to be provided for in the town. At the height of the epidemic the hospital staff, which consisted of a cook, and three male nurses, resigned and the doctor had to attend the patients, cook for them and bury the dead. The unfortunate doctor had to make all funeral arrangements, and carry out the funeral service. In one case the men refused to carry a coffin and the doctor was obliged to pay each man $2.00 to have the coffin carried a few hundred feet. The doctors were young men who had just graduated and their method of treatment was somewhat crude. It is said that in their right-hand pockets they carried a quantity of lead and opium pills, and in their left-hand pockets, compound cathartics. The usual treatment was to administer either one kind of pill or the other according to the patient's condition, and evidently, from the popularity of the doctors, their system met with some success!

"The Canadian novelist, 'Ralph Connor,' in his book, 'The Doctor', has given a description of the Kootenay district at the time of the C.P.R. construction work. The main character, who is a doctor, has been drawn from the characters of the early doctors in this district, and although all statements are not absolutely orthodox the book gives a good idea of the difficulties under which medicine was practised.

"Early in 1898 Mr. J. Haney, Superintendent of the Crow's Nest construction, requested that a hospital suitable for the needs of the men on construction be erected. He gave a generous donation of $5,000 towards this, and on May 1, 1898, a hospital, sixty feet by forty feet, two stories high, with about twenty-five beds, was opened at the Saint Eugene Mission. This was a great advance, as previous to this the doctors had been working under almost impossible conditions. Between 1898 and 1900 five hundred and sixty patients were admitted, and among these there were thirty deaths. During this time Sister Meletine, Superior of the Hospital, and four other Sisters from Montreal managed the hospital and attended the patients. At this time all C.P.R. work was done on the contract plan. The C.P.R. paid the hospital $1.50 per day for each patient, and

of this 12 per cent was received by the doctors. At the same time the Sisters tried to maintain the hospital by selling 'hospital tickets' to the men in the mining and lumber camps. The tickets entitled the men to free medical and hospital care during an illness. However, this proved very unsatisfactory as the men would not buy until they were ill, and this plan was soon abandoned and a new system, under which the mining and lumbering companies deducted so much from each employed man's salary for medical and hospital fees, was adopted. This was much more satisfactory, as each employed man had to respond to the maintenance of the hospital, but at the same time the doctors and hospital were running the risk of losing during an epidemic. This was the beginning of the contract system which in this district had gone through an evolution until to-day, when, if times are prosperous, nearly every patient attended comes under this plan.

"Soon it became obvious that the Mission Hospital was not large enough or the situation convenient for such a rapidly developing community, so plans were made to erect a more up-to-date and suitable building in a more central place. No time was wasted. Early in 1900, Colonel Baker donated five acres of his Cranbrook property to the Hospital. In June of that year the contract for the construction was given to Mr. Nevin, and on February 6, 1901, the Saint Eugene Hospital, operated by the Sisters of Providence, was opened. Since then the building has been greatly improved, new buildings added, and an up-to-date Nursing School has been attached, until to-day the whole institution is considered one of the best hospitals in British Columbia."

(To be continued)

"The public demands that the physician should cure in a moment, like a magician, or that he should at least employ pleasant methods, which is not at all times and in all cases possible. To blame the physician on Nature's account is a great injustice. Thus it is that sorcerers make their fortunes, even though they behave iniquitously, and their incompetent work brings them a good livelihood, while the physician must often endure poverty. The heart of the public is further turned from the capable physician and towards fools because the ignorant sometimes succeed in curing complaints where this has not been done by the most famous physicians. The causes are manifold—luck, opportunity, etc. Sometimes the qualified physician effects an improvement which is not, however, yet visible; the patient is then placed under another doctor, who rapidly brings about a cure and obtains the entire credit."—*Rhazes.*

Association Notes

Final Announcement Regarding the Sixty-Third Annual Meeting, Canadian Medical Association; and the Fifty-Second Annual Meeting of the Ontario Medical Association

TO BE HELD IN TORONTO ON JUNE 20th, 21st, 22nd, 23rd and 24th, 1932.

The two preceding issues of the *Journal* have carried announcements regarding the program for the Convention. In this issue, we desire to present the plans which have been arranged for the Hospital Clinics to be held on the mornings of Thursday and Friday, June 23rd and 24th.

Medical Clinics

ST. MICHAEL'S HOSPITAL

THURSDAY, JUNE 23RD, 8.30 A.M.–10.00 A.M.

1. Disseminated sclerosis.—J. Loudon.
2. Peptic ulcer.—A. J. Mackenzie.
3. Aortic aneurysm.—J. H. McPhedran.
4. Lung abscess.—E. A. Broughton.

Medical Clinics

TORONTO GENERAL HOSPITAL

FRIDAY, JUNE 24TH, 8.30 A.M.–10.00 A.M.

Members of the Medical Staff of the Toronto General Hospital will present cases and discuss the diagnosis and treatment of some or all of the following clinical conditions, depending upon the material available:— peripheral neuritis; ventricular tachycardia; anæmia; osteomalacia; nephritis; hypertension.

Obstetrical Clinic

BURNSIDE OBSTETRICAL DEPARTMENT, TORONTO GENERAL HOSPITAL

THURSDAY, JUNE 23RD, 8.30 A.M.–10.00 A.M.

Demonstration of obstetrical forceps.—John Mann.

Gynæcological Clinics

THURSDAY, JUNE 23RD, 8.30 A.M.–10.00 A.M.

Outpatients' Department, Toronto General Hospital

Cancer of the uterus.—Wm. A. Scott.

Ward F, Toronto General Hospital

Pelvic inflammation.—F. W. Marlow.

Clinics in Otolaryngology

TORONTO GENERAL HOSPITAL

THURSDAY, JUNE 23RD, 8.30 A.M.–10.00 A.M.

A collection of from 15 to 20 unusually interesting and instructive cases will be presented by the staffs of Western, Grace, Sick Children's, St. Michael's and the General Hospitals.

Pædiatric Clinics

HOSPITAL FOR SICK CHILDREN

THURSDAY, JUNE 23RD, 8.30 A.M.–10.00 A.M.

1. Bronchiectasis.—Gladys Boyd.
2. The outstanding points in the diagnosis of congenital heart lesions.—A. P. Hart.
3. The different types of mental disturbances of children, their diagnosis and disposal.—Geo. F. Boyer.

Pædiatric Clinics

HOSPITAL FOR SICK CHILDREN

FRIDAY, JUNE 24TH, 8.30 A.M.–10.00 A.M.

1. Chronic pyelitis; diagnosis, prognosis and treatment.—Pearl Summerfeldt.
2. The diagnosis and treatment of the commoner skin diseases.—H. A. Dixon.
3. Some aspects of mediastinal tuberculosis.—Harold Parsons.

Surgical Clinics

HOSPITAL FOR SICK CHILDREN

THURSDAY, JUNE 23RD, 8.30 A.M.–10.00 A.M.

1. Surgical treatment of joint tuberculosis, with end results.—D. E. Robertson.
2. Infantile paralysis.—J. L. McDonald.
   (a) Early treatment of paralyzed extremities and back.
   (b) Stabilization of paralyzed feet and paralyzed shoulder.
3. Congenital dislocation of the hips.—D. E. Robertson.
4. Club feet.—A. B. LeMesurier.
5. Torticollis.—R. M. Wansbrough.
6. Erb's palsy.—R. M. Wansbrough.
7. Ischæmic paralysis.—A. B. LeMesurier.
8. Underwater gymnasium.—D. E. Robertson.

Surgical Clinics

TORONTO GENERAL HOSPITAL

THURSDAY, JUNE 23RD, 8.30 A.M.–10.00 A.M.

1. Varicose ulcers.—J. H. Couch.
2. Injection treatment of hæmorrhoids.—J. A. MacFarlane.
3. Skin grafting.—S. D. Gordon.
4. Fracture of the carpal scaphoid.—Gordon Murray.
5. Genito-urinary cases.—J. C. McClelland.
6. Chest surgery—N. S. Shenstone.
7. Discussion on the care of colostomy.—F. I. Lewis.

Surgical Clinics

HOSPITAL FOR SICK CHILDREN

FRIDAY, JUNE 24TH, 8.30 A.M.–10.00 A.M.

1. Traumatic head injuries.—D. E. Robertson.
2. Fractures of the elbow, femur and humerus.—A. B. LeMesurier.
3. Appendicitis, Meckel's diverticulum.—J. L. McDonald.
4. Empyema.—J. L. McDonald.
5. Harelip and cleft palate.—A. B. LeMesurier.
6. Cystoscopy in children.—R. M. Wansbrough.
7. Sympathectomy.—D. E. Robertson.
8. Tuberculous glands.—R. M. Wansbrough.

Surgical Clinics

ST. MICHAEL'S HOSPITAL

FRIDAY, JUNE 24TH, 8.30 AM.–10.00 A.M.

1. Gastric surgery.—T. A. Robinson.
2. Surgery of the large bowel.—Jas. T. Danis.
3. Surgery of the chest.—Walter Carscadden.
4. Surgery of the biliary tract.—Jas. W. Ross.
5. Thyroid surgery.—Harold Armstrong.
6. Surgery of the brain and spinal cord.—David W. Pratt.
7. Application of the Arneth count.—Clifford Watson.

Tuberculosis Clinics

WESTERN HOSPITAL

THURSDAY, JUNE 23RD, 8.30 A.M.–9.30 A.M.

1. Detection of early lesions in general practice, by observation of contacts to tuberculosis.—Wm. E. Ogden.
2. Pneumothorax demonstration for the practitioner.—Geo. C. Anglin.

On Friday morning, June 24th, in the Pædiatric Clinic, at the Hospital for Sick Children, Dr. H. C. Parsons will show some cases of childhood tuberculosis.

(The accommodation for each of the above clinics is limited to 25.)

Special Notes

It is the belief of the Committee in charge of the annual meeting that a scientific program of a very high order has been arranged.

Plenty of entertainment for the doctors and their wives is assured throughout the week.

Golfers are reminded that the tournament takes place on Wednesday and Thursday. In addition to two handsome trophies, the Ontario Cup and the Hamilton Cup, other valuable prizes have been provided.

The Royal York Hotel is the headquarters for the meeting.

Toronto is on daylight-saving time.

An excellent Convention is anticipated.

PROPOSED AMENDMENTS TO BY-LAWS

I. According to the present By-Laws of the Association, the Article dealing with meetings of Sections,—Chapter 4, Section 2, reads as follows:—

> "The Chairman and Secretary for each Section shall be elected by each Section during the annual meeting, at a time provided by Council. They shall hold office until the conclusion of the next annual meeting."

On several occasions during the past few years, many Sections of the Association have not met at the time of the annual meeting, and, therefore, were not privileged to carry out the duties laid down in the By-Law above referred to. To meet this situation, the following Sub-Section of the said Section 2 is proposed as an additional clause:—

> "Where any Section fails for any cause to appoint Sectional Officers in any year, it shall be in order for the Executive Committee to nominate officers for that Section for the year."

II. Again quoting from the By-Laws, Chapter 8, Section 1, paragraph 2, in referring to the Executive Committee, says in part:—

> "At its first meeting, it shall appoint an Editor and Managing Editor of the *Association Journal*, shall define their respective duties and fix their salaries, shall appropriate a sum from the funds of the Association which shall be available for the ensuing fiscal year for the purposes of the Editorial Board."

In as much as the Editorial Board functions as a Committee of the Association analogous to other Committees, and, therefore, is not in need of operating through a separate fund set aside for it, but, on the contrary, operates through the general funds of the Association, Dr. F. S. Patch, the Honorary-Treasurer and Managing Editor, gave notice of motion at the last annual meeting that the above Section be amended by deleting the last Clause of the Section, which Clause reads as follows:—

> "shall appropriate a sum from the funds of the Association which shall be available for the ensuing fiscal year for the purposes of the Editorial Board."

The two amendments herein referred to will be presented to Council at the forthcoming annual meeting for disposition.

Hospital Service Department Notes

VENTILATION AND THE IONIC CONTENT OF AIR

Many investigators have endeavoured to discover the specific causes of deadness in the air of occupied rooms as contrasted with the air of the open country. This will persist even when temperature and humidity are controlled, and is not overcome by apparently adequate ventilation by mechanical means. More recently, the carbon dioxide, the stagnation, and the crowd-poison theories have been superseded by the theory of ionization, the deadness of the air being considered to be dependent upon the lack of ionization. In nature ions are produced by solar radiation, by cosmic rays, and by radio-active changes in the soils of the earth. Strongly ionized gases diffuse through the capillaries of the soil by the aspirating action of the wind and by variations in barometric pressure. It is believed that this soil respiration contributes about sixty per cent of the total ionic content of the air near the surface of the earth.

With the idea of studying the changes in the ionic conditions in the air in occupied rooms, Yaylou, Benjamin and Choate, of the Harvard School of Public Health, conducted a number of very interesting experiments which are published in a recent number of the *Journal of the American Society of Heating and Ventilating Engineers*. They found that, in contrast with the prevailing belief, the ionic content in unoccupied heated rooms did not differ much from that out of doors. However, in occupied rooms there was a marked decrease in both positive and negative ions. Immediately after the occupants assembled, the ionic content of the air fell abruptly to a very low value, which did not begin to rise until the people left the room. The minimum supply of outdoor air required to maintain the normal ionic content in a crowded room was found to be prohibitively high (160 cfm per person). With the usual air supply of 30 cfm per person, the ionic content differed very little from that when there was no ventilation. On the other hand, by means of artificial ionization it was possible to control both the quantity and the quality of the ions at any desired concentration, regardless of ventilation. It was found that heating the

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All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, Secretary, 184 College Street, Toronto.

air by means of a central fan system increased the ionic content, and cooling by a similar method decreased it. The usual method of washing, humidifying, or dehumidifying, deprived the air of all small ions and produced a great number of negative ions or condensation nuclei. Mechanical ventilation reduced the ionic content, and recirculation reduced both positive and negative ions. These results are very interesting and may affect considerably the development of ventilation systems of buildings, a borderline field of engineering and public health which is receiving a great deal of attention at the present time.

THE LAZARETTOS IN CANADA

There are in Canada two small lazarettos which are maintained for the care of the few lepers discovered at intervals in various parts of Canada. One is in the far west, at Bentinck Island, about three miles from William Head on Vancouver Island, where it was established about eight years ago, after it was decided that the former site on Darcey Island was too isolated. The other is at the fishing village of Tracadie in northern New Brunswick on the Gulf of St. Lawrence.

It is generally agreed that leprosy in Canada originated in the Orient. In the Bentinck Island colony all of the patients are Chinese and nearly all former ones have been orientals, although a few have been Russians. In New Brunswick the history of leprosy can be traced back to 1758, when it is said that French sailors from the "*Indienne*", a vessel trading with the Levant which was shipwrecked at the mouth of the Miramichi, spread the disease to the fisherfolk who gave them shelter. Since then it has been endemic in this area although, with greater isolation of cases, the disease bids fair to become extinct in this province.

The early history of the lazaretto in New Brunswick is replete with suffering and hardship. The buildings were poor; nursing and medical care were haphazard and weakened by the fear of contagion; financial support was decidedly precarious. The first pest-house built by the provincial government at Tracadie in 1844 was really a prison—the inmates could not even look out at the sea—and it was badly managed. A better building was erected in 1849 and proper medical care was arranged for these unfortunates. In 1868 the Religious Hospitallers of St. Joseph took over the lazaretto and have carried on this service most efficiently ever since; and in 1880 the Federal Government became responsible for the financial support of the lazaretto, although it is still conducted by the Hôtel Dieu Sisters. The history of the lazaretto in British Columbia reflects in similar manner the abhorrence of the disease, the early lack of adequate legislation, the poor housing, and the inadequate medical care. When the Federal Government took over the British Columbia colony in 1906, they repatriated back to China the fourteen inmates at that time and reequipped the lazaretto at Darcey Island. Later, in 1924, the isolated colony was removed to the more desirable location near William Head. In this institution the medical and nursing care is now the best obtainable and the cottages are very comfortable indeed.

On a recent visit to Tracadie it was noteworthy to observe that general patients are housed in the same hospital building as are the lepers. Of course the latter are in a separate wing and are permitted the use of a portion of the grounds only, but the old dread of leprosy has quite disappeared. None of the Sisters has ever contracted leprosy and, after examining a number of the ten lepers, it was considered necessary only that we wash our hands thoroughly with soap and water. None of the patients showed the extensive nodulation or ulceration of the textbook illustration, and, inasmuch as few practitioners have actually seen cases of leprosy, one wonders if a number of mild cases are not still at large undiagnosed. The atypical neuritic symptoms of one patient developed during the war, and the trouble was not correctly diagnosed until he was spotted in a Montreal hospital clinic some thirteen years later by an alert physician. The degree of infectivity is determined by the examination of nasal swabs for the *B. leprae* and this determines the extent of isolation required. Treatment by the injection of derivatives of chaulmoogra oil is favoured by the physician in charge and a number of patients have been discharged as cured. One or two others might be considered as cured, but, because of physical deformity, especially the loss of fingers, they remain in what to them is a comparatively happy home, for they have comfortable wards, are most kindly treated, and, among others provisions for their recreation, have a motorboat of their own for fishing.

A RADIO PILLOW THAT BRINGS CHEER

Hospital patients in England may listen to their favourite radio programs simply by resting their heads upon a comfortable pillow that is equipped for wireless reception. This pillow is a real joy to those patients in rooms in which the loudspeaker is not permitted, since it makes possible individual enjoyment of the radio without the discomfort of headphones. The pillow is connected to the set by leads, just as the loudspeaker or headphones are connected. (*Welfare Bulletin*)

There are other elements that can not be left out of the category of qualities a doctor needs if he wants to exercise the art of medicine with success. Dignity is one of these. The dignity I have in mind does not depend on what is facetiously called the bedside manner, nor upon the cut of the clothes, nor upon the appointments of the office. I can best define it by saying what is absent from it—familiarity, gossipiness, pomposity, and haste.—David Riesman.

Medical Societies

THE ACADEMY OF MEDICINE, TORONTO—SILVER JUBILEE CELEBRATION

The Silver Jubilee proceedings of the Academy of Medicine were held at the King Edward Hotel on the evening of April 7th, 1932. A large and representative gathering of the Fellows, their wives, and numerous invited guests from Canada and the United States assembled there and were received by the President, Dr. Harris McPhedran, and Mrs. McPhedran in the Crystal Ball-Room. Following this, dinner was served at which 300 sat down.

After the toast to the King, the President rose and expressed the pleasure that he felt at having the honour to preside at such a notable function, and thanked the Fellows for the splendid way in which they had supported the celebration. He then called on the Vice-President, Dr. R. S. Pentecost, to propose the toast to the Past-Presidents, who did so in his usual happy manner.

The President then introduced Dr. T. C. Routley as the Fellow through whose generosity it had been made possible to present to each of the Past-Presidents a miniature replica of the President's badge of office. Dr. Routley then made the presentations to the following: Drs. Albert A. Macdonald, H. B. Anderson, H. A. Bruce, John Ferguson, Alexander Primrose, Jabez H. Elliott, Robert T. Noble, J. T. Fotheringham, F. A. Cleland, F. N. G. Starr, A. J. Mackenzie, J. H. McConnell, F. W. Marlow, Warner Jones, and D. King Smith. Through illness, Drs. Alexander McPhedran, N. A. Powell, D. J. Gibb Wishart and Wilbur H. Harris were unable to be present. Dr. Albert A. Macdonald replied on behalf of the Past-Presidents.

The President then called upon Dr. H. A. Bruce to introduce the guests, among whom were Sir William Mulock, K.C.M.G., the Honourable J. M. Robb, Minister of Health for Ontario, and the following representatives of different medical societies, Dr. Archibald Malloch, of the New York Academy of Medicine, Dr. Howard Dittrick, of the Academy of Medicine of Cleveland; Dr. R. Tait McKenzie, of the College of Physicians of Philadelphia; Dr. John R. Williams, of the Rochester Academy of Medicine; Dr. C. K. Russell, President of the Montreal Medico-Chirurgical Society; Dr. H. B. Moffatt, of the Ottawa Medico-Chirurgical Society; Dr. F. J. H. Campbell, of the Western Ontario Academy of Medicine, London; Dr. C. Gooch, President of the Hamilton Academy of Medicine; Dr. J. W. McDonald, of the Academy of Dentistry, Toronto; and Dr. L. J. Austin, President of the Ontario Medical Association.

Dr. R. Tait McKenzie replied for the out-of-town guests and presented to the Academy an illuminated parchment scroll, conveying the greetings of the College of Physicians of Philadelphia to the Academy. Sir William Mulock then replied for the other guests present.

Professor L. J. Austin, of Queen's University, was asked to address the meeting and brought to the Academy congratulations from the Ontario Medical Association in his official capacity as President. He continued with some remarks in lighter vein which were very much enjoyed.

Congratulatory messages were received from the Calgary Medical Society and the Edmonton Academy of Medicine.

Dr. Stanley Ryerson gave a summary of his address on "Events leading to the formation of the Academy", and was followed by Dr. H. B. Anderson with a brief history of the development of the library and the Academy since its inception. The chief speaker of the evening, Dr. Archibald Malloch, then delivered his address on "William Osler" which was especially interesting on account of personal reminiscences.

Dancing followed the formal proceedings and added a note of gaiety to the occasion. With the arrival of one a.m., the party dispersed, everybody feeling that the celebration of the Silver Jubilee had been a most successful function.

GILBERT PARKER

THE CALGARY MEDICAL SOCIETY

At the annual meeting of the Calgary Medical Society the following officers were elected for 1932-1933:— *President,* Dr. A. Fettes; *Vice-president,* Dr. W. H. McGuffin; *Secretary,* Dr. A. H. Baker; *Sec.-treasurer,* Dr. D. W. Scott; *Librarian,* Dr. George Learmonth; *Executive Committee,* Drs. H. W. Price, A. B. Francis and W. A. Christie. During the coming year there will be an interchange of lecturers with representatives of medical societies from other cities in the province.

Members of the Calgary Medical Society and their wives were guests of the Knights of the Round Table at a dinner in the Alhambra dining-room given in honour of Prof. Bernard E. Read, Professor of Pharmacology and Therapeutics at the Peiping Union Medical College, Peiping, China. The address which he gave during the evening on "Prehistoric man and the Peiping skull" was listened to with rapt attention, as he unfolded the story of this scientific discovery. Professor Read first of all made reference to Dr. G. Elliott Smith's book on "The evolution of the dragon". How has the dragon progressed and what is a dragon? With most races it has been regarded as purely a mythological creature, yet it is one of the world's greatest symbols. To the dragon has been imputed the worst as well as the best and the finest. The dragon throne of the Orient brought with it the highest form of civilization. Going back to prehistoric man, how has he evolved from the savage to his present state to-day?

A young Canadian, Dr. Davidson Black, a graduate in Arts of Toronto University and of Western Reserve Medical School, Cleveland, was responsible for the establishment of the Peiping man, called by *Punch* "the man of sin." Doctor Black joined the staff of the Union Medical College, Peiping, in 1919, and even then was much interested in anthropology. Dr. W. A. Matthews, another prominent Canadian, had written a thesis on "The relation of climate to evolution". After reading this, Doctor Black made a study of "The distribution of primates in Asia", where he believed was the cradle of the human race. This was in 1925. After the discovery of the Java man and of the skull of a prehistoric man found in England, scientists turned to Asia, particularly as the writings of geologists pictured Asia in early times as a densely wooded and populated country. The rising of the Himalaya Mountains created a dry area in the centre of Asia which drove the ape out of the forests and caused him to lead a different life. It has been said that primitive man first learned to use a walking stick with a stone handle.

Doctor Black had a definite area not far from Peiping which he associated with primitive man, and in 1926 he was prepared to stake his reputation that a tooth which had been found in this neighbourhood belonged to a different genus the *Sinensis pekinensis*. He believed that the degree of fossilization had to do with the change in the tooth. In his search for evidences of primitive man he was financially assisted by the Rockefeller Foundation. He was associated in his work with a Swedish scientist and they went to where the teeth had been found in a fairly large hill. Every bit of earth in this hill was passed through a sieve so that no small bones would be missed. Two hundred packing cases of bones were removed. An elephant tusk, 180 cm. long and fossilized, was found. Hundreds of deer, monkey, hyæna and various rodent bones, chiefly of prehistoric days and not of types seen to-day, were found. There were two jaws of somethings not apes. These were the greatest contributions. There were slight contrasts in shape different from the gorilla and the teeth were the same as already found. On December 22, 1929, the Chinese geologist with the party brought out the actual skull of prehistoric man. This skull was embedded in the hardest of rocks and the hardest of dentist's drills was used to excavate it. A second skull was found, then two others, and more than enough teeth to fill other jaws.

Doctor Black has taken infinite pains to describe the Peiping skull of primitive man. How much did primitive man know and what could he do? Dr. Elliott Smith is of the opinion that this primitive man could not use tools. A large bed of material in the cave under the hill indicated that this early man, one million years ago, was using fire. This contribution of Doctor Black fills in the gap of what we know about the Piltdown man and the Java man and tells us something about his cultural side. Finds such as these which contribute to the subject of evolution spell hope for us and if we can compare the two we have hope for progress in the future. Even savage man had his longings and yearnings, and his hands were lifted upwards.

ON TO ENGLAND!

The party for the trip to the Centennial Meeting of the British Medical Association now numbers over one hundred. Arrangements have been completed for the group to stay at the Savoy Hotel in London, instead of the Metropolitan and Victoria.

There has been a marked reduction in the cost of post-convention tours on the continent. Further particulars may be obtained from the General Secretary.

THE EDMONTON ACADEMY OF MEDICINE

The March meeting of the Academy took the form of a symposium on septicæmia, which was presented at the University Hospital by members of the University Hospital Staff, under the direction of Dr. Egerton Pope, Professor of Medicine, University of Alberta.

The historical aspect of the subject was dealt with by Dr. Heber C. Jamieson who pointed out the acute powers of observation of Hippocrates in giving us the first detailed clinical account of septicæmia. Dr. A. C. Rankin, in discussing the pathogenesis, dealt with the morphological and immunological characteristics of the pyogenic organisms.

Symptomatology and diagnosis were treated by Dr. H. H. Hepburn, who described the clinical and laboratory findings. Treatment, both local and general, was dealt with by Dr. W. F. Gillespie who discussed particularly the treatment of infections of the hand. Septicæmia from the viewpoint of the urologist was presented by Dr. E. C. Smith. Dr. A. Day discussed the question of puerperal septicæmia and stressed the matter of prophylaxis in preventing morbidity and mortality. A survey of general treatment under leucogenic, biological, and chemo-therepeutic measures was presented by Dr. A. Blais.

The admirable presentation of the various phases of septicæmic states met with led to an active discussion. One gathered that the emphasis was to be placed on prophylaxis and conservatism in dealing with this disease.

T. H. WHITELAW

Special Correspondence

The Edinburgh Letter

(From our own correspondent)

A further onslaught on the present University medical curriculum was made recently at a debate at the Students' Union. Several practitioners in the city took part in the discussion, among others, Dr. Chalmers Watson, physician to the Royal Infirmary, and Dr. Hope Fowler, consulting radiologist to the Infirmary. It was suggested that the teaching of to-day was permeated too largely by the atmosphere of "curative" medicine of former days, and too little by the modern outlook on "preventive" medicine. Too little time is available for the students' personal study of practical medicine. The student is systematically overcrammed and has little or no time to educate himself. The overweighted curriculum arrests the development of his reasoning faculties. Too few hours are spent in the medical wards, out-patient department, and in dispensary practice. The growth of specialism in the last few decades, with the additional practical and theoretical classes associated with its development, has made the curriculum like an overgrown forest. Extensive pruning and the use of an axe is necessary. The view was also expressed that the student has to cram rapidly for examination purposes, and so is chock-full of theory and masses of detail. The result of all this cramming is a waste of time, and is apt to leave a man helpless in the face of an ordinary emergency, with the feeling that his education has been hopelessly mismanaged. Several students took part in the debate.

Most of the speakers agreed that the students saw far too much of disease in its last stages and too little of it in the early phases. One remedy to the present overloaded state of the curriculum was urged at a recent Inter-Universities Conference was to insist on at least an extra year of study. This would mean extra expenditure for a very doubtful return. And if a sixth year was thought to be the remedy, the question would soon arise whether a seventh year was not necessary, owing to the advance of research and the increasing complexity of medical knowledge. Surely it should not be beyond the ingenuity of man to invent some revision of the medical curriculum on sound principles. The students of other professions seem to be instructed on practical lines, so there should be no reason why some solution to the present difficulty should not be found.

The Public Health Committee of the Edinburgh Corporation has resolved to start a clinic for patients suffering from nervous and mental affections. This clinic will be under the direction of Dr. W. F. McAlister, of the Edinburgh District Asylum at Bangour. Although no beds for observation cases will be available at first, it is proposed that arrangements will be made for these in the near future. There are at present two mental out-patient clinics in Edinburgh, one at the Royal Infirmary and one at the Jordanburn Nerve Hospital, which is administered in association with Morningside Asylum. There is an in-patient department at the Jordanburn Hospital, and this and the two clinics work in the closest co-operation and form a most efficient health service. Patients seen at the Royal Infirmary who require indoor treatment are admitted to the Jordanburn Hospital, for such cases are not admitted to the Royal Infirmary. The existence of Mental Out-patients Clinics has done much to arouse the interest of the general public in mental disease. At the same time it enables patients suffering from the early stages of mental disease to obtain treatment while they are still in a curable state.

The Health Committee of the Glasgow Corporation has given general approval of a scheme to erect a new infectious disease hospital, at a cost of approximately £286,000. The new hospital which it is proposed to erect in the southern part of the city will have accommodation for 350 beds. The building will be so designed as to permit of an extension to 500 beds if required. The capital cost is roughly estimated at from £700 to £750 per bed.

An interesting comparison might be made between the ease with which Glasgow acquires a new hospital and the efforts being made in Edinburgh to raise the £400,000 necessary for the extension of the Royal Infirmary. At the close of eighteen months the sum of £230,000 has been raised by voluntary subscriptions. Health Exhibitions, Assaults-at-Arms, Football Matches, Theatrical Performances, and Tea-parties have all contributed their share to raising this amount. Recently Sir Harry Lauder made an appeal over the wireless on a Sunday evening. This brought in over £1,000, from listeners not only in the British Isles. Included among these subscriptions was one from Roumania, where the appeal had not fallen on deaf ears. Whatever may be said of the voluntary hospitals and their methods of raising money, their very difficulties tend to keep them in the public eye. A very large proportion of the annual income of the Infirmary is derived in small sums of a shilling and half-a-crown from the people of the artisan and working classes for whom the institution was originally intended, and who derive most benefit from its activities. The result is a widespread interest in the institution, in which so many have a personal concern, which cannot be said of hospitals merely supported by the rates or from the proceeds of sweepstakes.

Professor George Barger, of the Chair of Chemistry in relation to Medicine at Edinburgh University, has had the honorary degree of M.D. conferred upon him by the University of Heidelberg, where he gave a course of lectures last year.

Students of Aberdeen University have been deeply interested in the opening by the Prince of Wales of Manson House, the headquarters of

the Royal Society of Tropical Medicine and Hygiene. Sir Patrick Manson graduated M.B. at Aberdeen University in 1865. He also held the Honorary Degree of LL.D. from his Alma Mater. The University of Aberdeen was represented at the opening ceremony by its Chancellor, Lord Meston.

The Stanley Shield has been won by Edinburgh No. 8 Voluntary Aid Detachment of the British Red Cross Society. This trophy for voluntary sick-nursing and first-aid was instituted five years ago. It was presented for competition by the Hon. Sir Arthur Stanley, Chairman of the Joint Council of the British Red Cross Society and the Order of St. John. It is open to teams of V. A. D.'s from all over the British Empire. In the five years since its constitution Edinburgh has been successful in winning this All-British Competition on four occasions—twice by No. 12 Detachment and twice by No. 8 Detachment.

Prejudice against cremation as an alternative method of disposing of the dead continues to diminish in Edinburgh. The 1931 report of the Edinburgh Crematorium states that the number of cremations during the year was 169, an increase of 45 on the number in 1830. From the opening of the Crematorium on October 3, 1929, up to December 31 last, there have been 380 cremations.

GEORGE GIBSON

23 Cluny Terrace, Edinburgh.

The London Letter

(From our own correspondent)

Two names are associated in this country with the story of the modern developments of tropical medicine—Joseph Chamberlain and Patrick Manson—and recent events have enabled us to commemorate these pioneers. The Prince of Wales has opened the new home of the Royal Society of Tropical Medicine and Hygiene, known as Manson House, where the society, now numbering 1,700 members, can have adequate headquarters with a spacious hall for meetings, lounge-hall, library, etc. The first president of the society, on the occasion of its foundation in 1907, was Mr. Joseph Chamberlain, who together with Sir Patrick Manson had founded the London School of Tropical Medicine forty years ago. It was therefore very fitting that at a recent Court of Governors meeting in London Sir Austen Chamberlain should be elected chairman. It may be remembered that the foundation stone of the large new buildings of the London School, now in use for several years, was laid by Mr. Neville Chamberlain, so both sons of one of the pioneers are connected with present activities in the study of tropical diseases.

The use of the cinematograph in the study and teaching of medicine is becoming increasingly appreciated and clinicians are beginning to take moving-picture records of their cases just as they used to take still photographs. Meetings of the Royal Society of Medicine now so frequently contain in their program a short film to illustrate some point that the novelty is already wearing off. These remarks are prompted by a recent discussion at the Surgical Section of this Society on the whole question. Prof. R. E. Kelly, of Liverpool, illustrated his contribution to the discussion by a series of films all taken by amateurs, and the great difficulty experienced by amateurs in keeping the apparatus the exact distance for focus during a surgical operation has been surmounted by using a sterile piece of silk attached at one end to the wound and at the other to the camera. Most of the speakers at the meeting were concerned with the records of surgical operations, but such records alone are not so valuable as carefully constructed films with historical introductions, slow-motion illustrations of important steps carried out on the cadaver, and above all skilful cutting out of unessential detail. There is obviously a big field available for work along these lines, and perhaps in the future more and more teaching of anatomy, physiology, and embryology, for example, will make use of films. For the moment at any rate we are all interested in the subject, and Prof. Kelly has stimulated us to added effort.

The Local Government Act of 1929 made many differences in our hospital system, of which as yet a large majority of the profession seem scarcely aware. The new powers given to local authorities with regard to "Council" hospitals render it essential that close cooperation shall take place between these authorities and the management of voluntary hospitals. London, perhaps, enjoys special circumstances which make the problems specially complex and also, because of this complexity, make things easier for the moment, since the possibility of competition is far away in the future. In provincial towns, however, there is an urgent need for some well-thought out policy for the medical profession to adopt. The Brighton division of the British Medical Association has splendidly tackled the problem, and urges that for such a community the best solution is one large general hospital with out-lying recovery homes, local medical centres, or dispensaries, or private nursing homes. The advantages of the large central hospital are well known from a study of many European cities, and the many-sided activities going on under one roof should make for efficiency and progress. The one disadvantage that a combination of several existing hospitals into one might produce would be the development of an utterly unwieldy out-patient department. Brighton sees a way out of this difficulty by the use of out-lying medical centres, but the framers of the memorandum published on the subject speak with no uncertain voice about the out-patient system in general. They state that much of the work is unnecessary, wasteful of money, professional time and skill. It is suggested that except for emergencies no one should attend an out-patient department without a definite medical recommendation and treatment should as far as possible

not be given unless it is such that it cannot be obtained except at a hospital. These remarks are made because there is at the moment an investigation into the whole subject of out-patient work proceeding in London, and we are at times provincial enough to forget the existence of other towns with similar problems.

The elucidation of the etiology of disseminated sclerosis has been occupying much attention since it was reported that the causal organism had been found. The discovery of Chevassut and Purves-Stewart was made the basis of a form of vaccine treatment and good results were said to have been obtained. Since the early papers on this subject many workers have attempted to confirm Chevassut's laboratory findings with conspicuously negative results. More or less repudiated by the hospital where the original work was done Miss Chevassut was offered special facilities for continuing her researches by the Halley-Stewart Trust. After nearly a year this body has had to report this experiment as a complete failure, and in conjunction with serious criticisms of various points in the technique employed made at home and abroad the conclusion is forced upon us that the end of the popularity of the "spherula insularis" has been reached. Good results from vaccine are still being reported by some authorities, but, the scientific basis being exploded, this form of treatment is likely to pass away. It is true to say that this episode of British neurology has not raised its prestige in the eyes of other nations.

ALAN MONCRIEFF.

London, May 1932.

Topics of Current Interest

Maternal Mortality and Puerperal Fever*

The Medical Research Council has been co-operating in a systematic study of puerperal fever with the staff of Queen Charlotte's Hospital at Hammersmith, where a new isolation block has been erected for treatment, having research laboratories in close association with it. The Rockefeller Foundation of New York is making a grant of £3,000 a year for seven years to the Council for the fuller development of this work. Dr. Leonard Colebrook and Dr. R. Hare have been conducting a special investigation on the therapeutic value of arsenical preparations in puerperal fever, and the problem of bacteriotropic immunity to streptococci. Further work has also been done on the biological characters of anaerobic streptococci, and on the efficacy of antiseptics in midwifery. Dr. R. M. Fry and Miss E. Cooper are studying the different factors predisposing to puerperal sepsis, and the relative importance of hæmolytic and anaerobic streptococci in its causation. With Mr. A. T. Fuller, Dr. Fry is also investigating the bacteriology and treatment of urinary tract infections in the puerperium. At Sheffield a group of 550 women attending the ante-natal clinic of the Jessop Hospital and the Sheffield Municipal Clinic has been under observation. Alternate cases were given a preparation rich in vitamins A and D throughout the last month of pregnancy; other cases did not receive this supplement, and thus afforded controls for comparison. It was found that in the group receiving added vitamins only 1.1 per cent developed pyrexia of the British Medical Association standard, while in the control group 4.7 per cent of the women developed pyrexia. Other methods of comparison confirmed the protective power of the vitamin preparation. It is remarked in the report that these results give a new emphasis to the importance of suitable diet during pregnancy as a means of increasing the resistance to bacterial infection, and so lowering the maternal morbidity and mortality rates. In a series of twenty-seven cases of septicæmia, bacteriologically diagnosed and treated with diets very rich in vitamin A, there was a mortality of seven cases. In sixteen cases *S. hæmolyticus* was found in the blood, and there were five deaths. This mortality is well below that usually ascribed to this infection, but, in the absence of sufficient control cases, any definite conclusion as to the efficacy of the treatment would be premature.

In Edinburgh a further study has been made of the after-histories of women who have suffered from the toxæmias of pregnancy. Special attention is being given to the problem of reducing by dietetic and other measures the risk of permanent disablement from these conditions. At Glasgow Dr. D. Baird, aided by a part-time grant for work on infections of the urinary tract in pregnant women, has been employing the intravenous injections of substances opaque to x-rays to gain additional knowledge of the physiology of the kidney and ureter. This method has been found to be particularly suitable for pregnancy, since it provides a satisfactory picture without any need for the passage of instruments. At University College Hospital, London, Mrs. J. Taylor, with a part-time grant, is investigating a large series of obstetrical cases before and after delivery to trace the sources of bacterial infection. Special attention has been given to the pathological significance of the anaerobic streptococci, and an attempt has been made at their classification.—*Brit. M. J.*, 1932, **1**: 530.

* Cmd. 4008. Report of the Medical Research Council for the Year 1930-1931. London: H.M. Stationery Office. (2s. 6d. net.)

Deaths of Physicians in the United States During 1931

During 1931, the deaths of 2,952 physicians of the United States were recorded in *The Journal*, as compared with 2,943 during 1930 and 2,797 during 1929. The list includes one who died in the Philippine Islands, one in Porto Rico, three in China, two in India and one each in France, South America, Central America, Mexico, Norway and Sweden. The total number published was 3,074, which includes 122 Canadians. In 1931 the obituaries of 84 women physicians were published, as compared with 80 in 1930. Twenty-six negro physicians died during the year. The graduates of medical schools in the United States for the fiscal year ended June 30, 1931, numbered 4,735. Deducting the number of physicians whose obituaries were published, there was a net addition to the ranks of the profession for the year of 1,783, which, figured thus, is an increase of 161 over 1930.

Ages.—The average age at death of those classified as of the United States was 63.8, as compared with 63.7 for 1930. Two physicians were 99 years old and thirty lived to be 90 or more. One was 23 years old and two were 24. Twenty physicians died between the ages of 25 and 29, 51 died between 30 and 34, 66 between 35 and 39, 86 between 40 and 44, 169 between 45 and 49, 285 between 50 and 54, 360 between 55 and 59, 426 between 60 and 64, 428 between 65 and 69, 420 between 70 and 74, 296 between 75 and 79, 202 between 80 and 84, and 140 at or above 85. March was the month of most deaths, with 292.

Accidental deaths.—One hundred and thirty-nine physicians died as a result of accidents in 1931, compared with 130 in the previous year. Automobile accidents accounted for seventy-one, five more than in 1930. In 1931, deaths from falls numbered 22, the second largest number among those due to accidental causes. Eleven deaths were caused by drowning, 7 by airplane accidents, 6 by gunshot wounds, 3 each by illuminating gas and carbon monoxide, and 2 from overdoses of medicine. The remaining accidental deaths resulted from the following causes: burns, phosphorus, carbon tetrachloride and alcoholic poisoning, earthquake, explosion, anæsthetic, cut by glass, head caught in drawer of wardrobe trunk, collision of horse and buggy with train, burns from x-ray machine, crushed by automatic elevator, baked in electric cabinet, cut while shaving, collapse of concrete pillar, and street car accident.

Suicides and homicides.—Sixty-four physicians committed suicide in 1931, two less than in 1930. The method most frequently employed was shooting, which accounted for 34 deaths. Poison was used in 5 cases, hanging in 4, incised wounds 4, drugs and gas 3 each, carbolic acid, drowning, anæsthesia and strangulation 1 each, and in the remaining cases the method was not reported. Nine homicides were caused by shooting and 1 by stabbing.

Causes of deaths.—Heart disease was again the leading cause of death, with 1,065 deaths compared with 1,059 for 1930. Some contributory causes are included in the tabulation, as they have been in former years. A report that the cause of death was "chronic nephritis and heart disease," for example, is so published in *The Journal* and is reported on the statistical charts under both diseases. Of the deaths from heart disease, endocarditis or myocarditis was specified in 342, angina pectoris in 114 and pericarditis in 7. Cerebral hæmorrhage was the second most frequent cause reported, with 365 deaths; 25 additional deaths were reported as due to paralysis. Pneumonia was the third most frequent cause; lobar pneumonia was reported in 254 cases and bronchopneumonia in 58. Fourth on the list was arteriosclerosis, with 252 deaths. Nephritis caused 237 deaths, of which 18 were specified as acute nephritis. Of the 236 deaths caused by cancer, the stomach and liver were affected in 63 cases, the intestine in 29, the prostate gland in 24, the buccal cavity in 12, and in 108 the part affected was not specified. Embolism and thrombosis caused 104 deaths; uræmia, 80; tuberculosis, 65; diabetes mellitus, 64; septicæmia, 45; appendicitis and typhlitis, 43; intestinal obstruction, 22, and other diseases of the digestive system, 38; diseases of the prostate, 40, and other diseases of the genito-urinary system, 25; influenza, 36, and other diseases of the respiratory system, 40; senility, 36; cirrhosis of the liver, 26; hypertension, 24; peritonitis, 23; ulcer of the stomach, 21, and other diseases of the stomach, 6. Conditions that caused a few deaths each are as follows: cholecystitis, 18; pernicious anæmia, and diseases of the bones and organs of locomotion, 16 each; encephalitis, 15; biliary calculi and gangrene, 14 each; leukæmia, 13; meningitis and sarcoma, 11 each; chronic bronchitis and asthma, 9 each; erysipelas, 8; dementia paralytica, 8; other diseases of the nervous system, 7; diseases of the liver, agranulocytic angina and paralysis agitans, 6 each; carbuncle and diseases of the veins, 5 each; diseases of the circulatory system, pleurisy, acute articular rheumatism and aneurysm, 4 each; alcoholism, hernia, Hodgkin's disease, sinusitis and agranulocytosis, 3 each; tetanus, tumours, shock, heat prostration, septic sore throat, diseases of the spinal cord and diseases of the artery, 2 each. The following list of causes was given for one case each: general diseases, locomotor ataxia, diseases of organs of hearing, diseases of skin or cellular system, scarlet fever, pancreatitis, chorea, anthrax, hæmorrhagic purpura, Banti's disease, psittacosis, lymphosarcoma, splenic anæmia, insanity,

hiccups, Friedreich's ataxia, pellagra, episiotomy, brain abscess, sunstroke, undulant fever, encephalomalacia, adenoma of the pituitary gland, adenoma of the prostate, epilepsy, poliomyelitis, acute abscess, secondary anæmia, hypernephroma and brain tumour.—*J. Am. M. Ass.*, 1932, **98**: 994.

Resistance at High Altitudes

While preparing for the attempt to climb Nanga Parbat by "siege" methods it would be as well for the climbers to take account of the very careful research work carried out and published by Dr. Argyll Campbell while I was in charge of the Department of Applied Physiology at the National Institute for Medical Research.

Dr. Campbell kept over one hundred mammals of various kinds, in an atmosphere equal to that at the top of Mount Everest, and found in all of these that not only no acclimatization took place but there was progressive deterioration, which accompanied degenerative change in the cells of the heart, liver, and kidneys, the result of insufficient oxygen. Very few of the animals survived for eight days, and the breathing of oxygen for short periods did not help. Dr. Campbell found that the degenerative changes began at altitudes above 20,000 feet; it is noteworthy in this respect that natives do not take their flocks above 18,000 feet on the Himalayan slopes.

None of the famous climbers have spent more than 10 days at the very great altitudes, such as 25,000 feet, and a significant lessening of efficiency has been reported; those who set out to try to reach the top of Everest lost their lives. It should be borne in mind that want of sufficient oxygen lessens the power of judgment. The power of any individual climber to resist this want cannot be tested by a short exposure to lessened atmospheric pressure. The climbers should aim at one or two of their party, who prove to be most resistant, reaching the top as quickly as possible after leaving the base camp placed below 20,000 feet before serious degeneration of the heart has taken place.—Prof. Leonard Hill, in the *Weekly Times*, Jan. 28, 1932.

Skin Irritation from Brazilian Walnut Wood

In a cabinet-making plant employing about one hundred men there developed early in February of this year, according to the United States Public Health Service, a number of cases of inflammation of the exposed portions of the skin of the workers. These cases occurred while the men were working on an order calling for the use of Brazillian walnut. Cases continued to develop until a total of eleven had occurred. The symptoms varied from a slight reddening of the skin on the exposed parts to a very severe inflammation of the hands, forearms, entire face, and neck. The length of time elapsing between exposure to the wood and development of the symptoms varied from two days to two weeks. It is of interest that several other tropical timbers are known to produce inflammatory reactions on the skin of persons working with them.

Cases also occurred in nine out of ten other plants using this wood. It appears that tolerance to this wood usually develops after exposure. Tests with sawdust from the wood on three volunteers showed a positive susceptibility-reaction in each case.—*The Diplomate*, 1932, **4**: 86.

Burning Celluloid

Since the Cleveland disaster two years ago much attention has been given to the dangers arising from the inflammable nature of the cellulose nitrate base upon which ordinary x-ray film is laid. They were strikingly illustrated in a moving picture shown by Prof. Fedor Haenisch, of Hamburg, to the British Institute of Radiology at its annual congress held in London last week. Besides the nitrate base there is the so-called safety film, in which the base consists of cellulose acetate. This costs about 20 per cent more than the other, it is more difficult to handle in the dark room, and there is some doubt whether the finished film has the same permanence as on the nitrate base. For these reasons nitrate film is still used by the great majority of hospitals and private radiologists. The principal danger to life from its use is not so much the risk of fire from the freely burning film, as the inhalation of toxic gases evolved when the celluloid undergoes flameless disintegration in the absence of a free supply of oxygen. Prof. Haenisch showed how when a blazing mass of nitrate film is thrust under the surface of a large excess of water the flames may be extinguished all right, but the celluloid continues to decompose beneath the water until the whole of it is destroyed, with evolution of large volumes of gas consisting of the various oxides of nitrogen, carbon monoxide, and prussic acid. The most dangerous of these appear to be oxides of nitrogen. After the Cleveland disaster the American Chemical Warface Service showed that the inhalation of these fumes in a concentration of three to five parts per 10,000 of air is immediately fatal. And a kilogramme of celluloid can liberate some 600 litres of gas when this flameless decomposition occurs. It is essential for firemen and all who have to deal with nitrate film to be aware of the danger from inhalation of minute quantities of nitric fumes.

In Germany a definite standard has been laid down to which film sold as "safety" must conform. A strip 20 by 3.5 cm. of the film to be tested is clamped in a horizontal position by one end, and a match is applied to the lower corner of the free end. If the film either ceases to burn upon the withdrawal of the match, or takes more than 60 seconds for its complete combustion, it is entitled to be described as safety film. Prof. Haenisch illustrated this test with both nitrate and acetate samples, and showed that the test strip of the latter invariably ceased to burn immediately after the withdrawal of the match. The acetate film will not smoulder, or undergo flameless disintegration, and therefore does not evolve toxic gases in any serious quantity. Hence the storage danger of acetate film is no greater than that of paper. He also demonstrated the slowing down of the combustion rate of nitrate film brought about by the paper and cardboard wrappings in which it is sent out. When an unopened packet of 12 nitrate films was placed in the actual flame of a bunsen burner, some five minutes elapsed before the film took fire; it was then easily extinguished, and it was found that only the extreme edges of the films were burned. It is most desirable that film makers should reduce the price and, if possible, remove the inherent drawbacks of the acetate base. In the meantime stringent regulations governing the storage of nitrate film have been made in America and Germany. They are in fact so drastic that the cost of their application would be prohibitive in most hospitals in this country, and it is doubtful whether they are necessary. What really matters is that the film store should be situated either in an outbuilding, or else on the top floor of the building, so as to minimize the risk of invasion of the inhabited portion by the fumes, should ignition occur. The store should be well ventilated, and have a thin glass window, easily broken by air pressure, to allow of the free escape of the gases. High-pressure steam heating and plug connections for portable electric lamps are to be avoided, and precautions should be taken to prevent overheating by the sun, where that is possible. For it must be borne in mind that overheating of the film, without the application of an actual flame, may be enough to initiate disintegration. The American regulations insist upon automatic sprinklers, but the quantity of water available would hardly suffice to extinguish the burning celluloid, and might well chill it to the point at which flameless decomposition would take place. Once any considerable quantity of celluloid has become ignited, it is probably safer to allow it to burn freely until it is all destroyed.—*The Lancet*, 1931, **2**: 1310.

Medico-Legal

AN AVERTED LEGAL MENACE

In the first number of the most recent volume of the Ontario Law Reports is the report of a case of the greatest importance to the medical profession and one which should receive notice from every medical man, perhaps, more especially from surgeons. It will be sufficient to mention the facts of the case to show complete justification for this statement.

A woman, Mrs. D., had been under the professional care of Dr. M. in the city of K. in Ontario, and had removed to Detroit. She came over to K. in 1929 on a visit; consulting Dr. M., it was made apparent that she must submit to an operation for what was called "gall-bladder trouble." Dr. M. performed the operation under the eye of Dr. A., the Professor of Surgery in the University at K. The result was not satisfactory: and when Mrs. D. returned to Detroit, another operation was considered necessary, and it was performed by surgeons in that city.

The husband brought an action against Dr. M. for malpractice: he charged, indeed, that the agreement between his wife and Dr. M. was that Professor A. was to perform the operation; but we pass over that allegation, as not material to the matter we are to discuss. At the trial before Mr. Justice McE., the evidence was taken of medical men in Detroit as well as in K.: and, while one medical man swore that the operation actually performed, was "not one that is generally approved", yet "it is a recognized practice". It is, however, to be noted that not one of the several medical men called said or suggested that the operation had been ignorantly, improperly or negligently performed.

The action being dismissed, an appeal was taken by the husband to the Appellate Division at Osgoode Hall at Toronto, composed of five Judges. Notwithstanding the fact that no medical man had sworn to anything like malpractice, two of the Judges found that there had been malpractice in the operation, considering, apparently, that they had the right to determine this even in the absence of medical evidence.

Fortunately, the other three Judges followed the law as laid down nearly fifty years ago, and constantly followed in our Courts, which said that "the point which the plaintiff assumed to establish was that the injury under which he now suffers is attributable to the negligence of the defendant—the point thus to be established, necessarily required that it should be established by the evidence of scientific witnesses, skilled in surgery. . . ." The main judgment — the author of which few medical men will find difficulty in identifying—went on to state that "It

is notorious that operations by the best surgeons may be unsuccessful and followed by untoward sequelæ, that the surgeon does not guarantee success or perfect results but only that he has and will use a reasonable degree of skill and learning, and that he will exercise reasonable care and exert his best judgment to bring about a good result. Even if an untoward result were proved in this case, it would be contrary to all our jurisprudence to convict a practitioner of ignorance or neglect without evidence that such result was due to his default.''

It is somewhat startling to find that the profession have been saved by a bare majority of voices—by a single voice—from a state of affairs in our law, in which a Judge, who is a layman as regards surgery, could decide that an operator was ignorant or negligent in surgical operation, from his own supposed knowledge, without a little evidence from one who was qualified to speak, as the Judge is not.

Were this made the law of the Province, it would be necessary for the profession to call upon the legislature to change it; it would be intolerable that surgeons should be subjected to such a peril. Fortunately, the danger is over for the time at least; but it would not be wise to consider that the danger can never recur.

NOTE: This comment is based upon facts supplied to us by a prominent member of the Law Society.

KENNY *vs.* LOCKWOOD

We have already referred (the *Journal*, August, 1931) to the case of Kenny *vs.* Lockwood, in which Mr. Justice McEvoy gave judgment in favour of the plaintiff, with $3,000 damages and costs. The case was appealed and was dismissed by the higher court. One of the three judges in the Court of Appeal, however, was of the opinion that only Dr. Lockwood should have the action dismissed against him. In his opinion both Dr. Stoddart, who operated on the patient, and the Lockwood Clinic should pay damages and costs, but the damages he thought should be reduced to $1500.

The conclusions of the two judges who favoured dismissal of the action are, in part, as follows:

1. That there was no case made against the defendant corporation, which merely provided surgeons, equipment and facilities for operations and treatment, and therefore the action against the corporation should be dismissed.

2. There was no proof, nor attempt to prove, that false or fraudulent representations regarding the operation and its consequences had been made beforehand. As regards that issue, therefore, the action against Drs. Stoddart and Lockwood must be dismissed.

3. The relationship between Dr. Stoddart and the plaintiff was that of surgeon and patient, and as such the duty cast upon the surgeon was to deal honestly with the patient as to the necessity, character and importance of the operation, and its probable consequences. . . but such duty did not extend to warning the patient of the dangers incident to, or possible in, any operation, nor to details calculated to frighten or distress the patient. Dr. Stoddart reasonably fulfilled his duty in this relationship, not being guilty of ''negligence in word'' or ''economy of truth,'' nor of misleading the patient.

The third judge took the view that the patient was very positive as to the assurances which were given her by Dr. Stoddart of the success of the proposed operation, and the absence of warning of the possibility of untoward results. He therefore was inclined to agree with the ruling of the trial judge that the plaintiff should recover from some of the defendants.

Abstracts from Current Literature

MEDICINE

Coronary Disease in One Hundred Autopsied Diabetics. Nathanson, M. H., *Am. J. M. Sc.*, 1932, **183**: 495.

Nathanson has studied the records of 100 diabetics who came to autopsy, with reference to cardiovascular disease and especially arteriosclerosis of the coronary arteries. He has compared the frequency and extent of the lesions in these with a large series of controls and has found that the incidence of coronary disease in persons with diabetes over fifty years of age is six and a half times greater than in those without diabetes. The coronary arteries were considered as diseased only where there was marked sclerosis with definite narrowing and partial obliteration of the lumen of one or more large branches.

In his series of 100 cases, 74 were above the age of fifty years; of these 29, or 52.7 per cent, had coronary sclerosis. Below this age period the incidence was negligible. These figures are compared with a series of 249 consecutive autopsies on persons over fifty years but without diabetes. In this group only 21, or 8.2 per cent, showed extensive coronary sclerosis. The incidence of coronary sclerosis in male diabetics was found to be somewhat higher than in the females; 50.9 per cent of the males and only 28.0 per cent of the females were affected.

These figures are in contrast to the relative frequency of hypertensive hypertrophy of the heart in diabetic and non-diabetic persons. Nathanson found that only 17.3 per cent of the diabetics had hypertensive hypertrophy of the heart, as compared with 12.1 per cent of con-

trols. It was further shown that the incidence of coronary disease was greater in diabetics with gangrene than in uncomplicated cases. The author is unable to state that diabetes is the causative factor in the arteriosclerosis, but considers the vascular disease as a coincidental process or as a sequel to the diabetes.

E. S. MILLS

The Nature of the Physical Signs of Bundle-Branch Block. King, J. T. and McEachern, D., *Am. J. M. Sc.*, 1932, **183**: 445.

The authors draw attention to a simple but moderately accurate method of determining a bundle-branch block without the aid of the electrocardiogram. It consists in making a careful observation of the apex beat of the heart. If bundle-branch block be present there will invariably be a visible and palpable reduplication of the apex thrust. Audible reduplication can at times be made out on auscultation, but this sign is by no means so constantly present. Fifty consecutive cases of bundle-branch block were studied with a view to determining the accuracy of these signs. Visible reduplication of the apex thrust was present in 42, or 84 per cent, and palpable reduplication in 40, or 80 per cent. In only 28 (56 per cent) was the first heart sound split into two elements. This method definitely failed in only 6 of the 50 cases in which electrocardiogram showed a bundle-branch block to be present. This visible reduplication was graphically recorded in many instances by means of a light broom straw fastened by means of adhesive tape to the chest wall in the region of the apexbeat, that is at the point of maximum intensity. Its movements can be seen with the naked eye and also recorded photographically. The paper is illustrated by a series of synchronous apex cardiograms and electrocardiographs.

E. S. MILLS

The Clinical Significance of Precordial Tenderness—the Relationship of Such Tenderness to Pain. Kellogg, F. and White, P. D., *New Eng. J. Med.*, 1932, **206**: 632.

Because of the lack of knowledge concerning the significance of the common finding of precordial and substernal tenderness the authors made a clinical study of the subject with particular reference to the presence or absence of heart disease. From 3,770 consultation cases they collected 328 cases of definite precordial tenderness, making an incidence of 8.7 per cent. Of the total series, 249 patients were females and 79 males. However, among the 86 patients known to be dead, the division between the two sexes was more nearly equal; there were 49 females and 37 males.

The authors conclude that precordial tenderness may occur in an individual with a hypersensitive nervous system, whether or not there is serious heart disease. In this series it was more often found when there was a combination of heart disease and nervousness than with either condition alone. The factor of nervous irritability and fatigue is certainly of greater importance in the production of the sign than is organic cardiovascular disease itself, for in cases of very severe acute and fatal coronary thrombosis there may be no tenderness whatsoever, and in many nervous individuals with perfectly normal hearts there is well marked precordial tenderness.

LILLIAN A. CHASE

Erythromelalgia and other Disturbances of the Extremities accompanied by Vasodilatation and Burning. Brown, G. E., *Am. J. M. Sc.*, 1932, **183**: 468.

The author has studied 81 patients suffering from burning pain of the hands or feet. Only 10 of these were classified as true primary erythromelalgia. The second group consisted of three cases where there was a primary unilateral disturbance of vasodilatation involving either the hands or feet. The third group was made up of 23 cases of paræsthesia with some intermittent vasodilatation of the affected part, but in which parallelism could not be demonstrated between surface temperature and the burning distress. The fourth group consisted of 27 cases of paræsthesia in which burning distress was present, the affected parts were cold but periods of vasodilatation did not occur. A fifth group was constituted of 10 cases of polycythæmia vera with circulatory disturbances characterized by burning in the extremities. The incidence of true erythromelalgia, even among patients suffering from burning distress in the extremities, is therefore quite small. It is important to separate cases of burning pain in hands or feet in which this symptom is secondary to other diseases as polycythæmia, toxic effects of heavy metals as arsenic and mercury, gout and peripheral neuritis. Even greater difficulty is experienced in subjects of advanced age with general arteriosclerosis whose major complaint is burning in the extremities. The condition may be bilateral and show some vasodilatation as in true erythromelalgia, but the surface temperature in the extremities is never raised. For the diagnosis of true erythromelalgia the fundamental criteria are, (1) bilateral burning pain in the extremities; (2) sharp increase of local heat in the affected parts, but redness, flushing and congestion may vary in degree; (3) production and aggravation of the distress by heat and exercise; (4) relief by rest, cold and elevation.

During the attacks of burning in true erythromelalgia the surface temperature of the part affected may reach or exceed 33° and 34° C. The rate of heat loss is increased, as is the force of the arterial pulsation. The author has had some measure of success from the application of radium locally.

E. S. MILLS

Pulmonary Fibrosis — Experiments of Short Duration. Lemon, W. S. and Higgins, G. M., *Am. J. M. Sc.*, 1932, **183**: 153.

Among the dusts inhaled, silica has the most injurious effect on the lungs of all industrial substances in this group. Other factors such as infection, moisture, nationality, of course have a bearing on the progress or intensity of the pulmonary fibrosis. The sequence of events is that first the cilia of the outer respiratory tract are destroyed, then the dust particles reach the alveolar cells causing swelling here, later swelling and fibrosis of the peribronchial tissue and lymphatic channels.

Experiments showed that these particles finally lodge in the lymphatic spaces and tissue where they are ingested by phagocytes, these come from the mesenchyme cells in the interalveolar septa, are mononuclear, and migrate to all parts of the lung, carrying the foreign particles away from air cells to the lymphatic tissues of the lungs. The character of these cells changes to a fibroplastic type which develops into granulation and finally scar tissue. The reason that silica dust does so much harm is not because it is insoluble but because it is soluble and produces in combination a chemical tissue reaction which affects a constantly increasing amount of lung tissue, reducing it to scar tissue. This progresses as long as silica is present in the lung, which explains, the development of respiratory incompetency long after men have ceased working in dusty atmospheres. Silica produces or becomes a protoplasmic poison.

P. M. MACDONNELL

The Dynamic Bronchial Tree. Macklin, C. C., *Am. Rev. Tuber.*, 1932, **25**: 393.

The bronchial tree is pictured as not static, but dynamic, that is, as undergoing constant respiratory movement, which consists in inspiratory extension of the tubes, with widening, and expiratory shortening with narrowing. This action is necessary to the free inflation of the terminals of the tree, which make up the lung substance. The expansion of the pleural cavity is lop-sided, and thus the lung has to be shifted in inspiration toward the actively outmoving walls and floor, and back in expiration. This shifting movement centres in the hilum, and is dependent upon normal flexibility of the root, for if this is diminished the ventilation of the pulmonic region above and behind the hilum would be hampered. Since tuberculous lesions are so prevalent here, it is suggested that they may be associated with stiffening of the root, probably in early life. The need for the establishment of the normal range of lung root movement is stressed. This calls for the concerted action of x-ray men and clinicians in a survey of human subjects of all ages, particularly in childhood. Diagrams are used to illustrate the points made.

C. C. MACKLIN

The Clinical Types of Abnormal Obesity. Jarlov, E., *Acta med. Scandinavica*, 1932, vol. 47, Supp. 42.

The problem of obesity has occupied the minds of clinicians since V. Noorden regarded it as being either exogenous or endogenous. Jarlov recognizes that in spite of advances in endocrinology there is some obscurity as to the cause of obesity and, at the commencement of his paper, discusses various classifications. The author postulates three main types, the hypertrophic, the myxœdematoid and the lipomatoid, with a number of transitional forms.

An important etiological factor in the hypertrophic type seems to be the excessive ingestion of food. The obesity commences early and is not related to puberty, parturition or the menopause. Such patients appear exceedingly overfed. The seminal development and distribution of hair is normal. The metabolic rate is within normal limits. In the earlier decades diabetes mellitus is common and, later, arthritis and myocardial degeneration occur. Persons of the plethoric type are small, short-necked and well-developed. They feel hot but do not sweat excessively. The genitalia are normal. The face is red with a cyanotic tinge. This group tend to develop hypertension (arterial) in the middle decades of life. Overeating is not a prominent factor, whereas heredity seems to be important.

In the uratic group, the individuals are above medium stature. The face is yellowish pale. There is a distinct tendency to the development of gout. Persons of the asthenic type complain of constant fatigue, vague anxiety, headaches. All of them suffer from constipation. The acromegaloid group comprises persons of high stature, virile features and large hands and feet. There may be an excessive growth of hair upon the face. Obesity commences here between 25 and 35 years. Curiously enough the wrists, ankles, hands and feet show relatively small deposits of fat. It is advisable, of course, to exclude a pituitary tumour by perimetry and x-ray studies of the sella turcica.

The cerebral type is rather rare. Often there is a history of infection, such as influenza, encephalitis, etc., preceding the onset of

obesity. The memory is impaired, and some show a somnolent tendency and even a frank Parkinsonian habitus. The metabolic rate is lowered, sometimes very markedly; thyroid medication may aid. The myxœdematoid group presents some resemblance to true myxœdema and should be recognized easily, if one bears the possibility in mind. A large majority of these patients respond well to treatment with thyroid preparations. The œdematous type corresponds to the "pituitary-cerebral-peripheral" type of Zondek. Such people have a constant œdema of the face, which is pale or slightly pink. They do not do well with thyroid treatment. There is present in the lipomatoid variety a distinct hereditary or family predisposition to obesity. Females only are affected and their stature is very small. Obesity occurs about puberty or before the age of 25 years. The upper part of the trunk is fairly normal, as the fat tends to be deposited upon the lower thorax, abdomen, loins, nates, femora and the upper part of the crura. The lipomatoid adipose tissue is very hard, while the overlying skin is thick, tense and somewhat cyanotic. There may be a thick growth of hair on the lower extremities.

H. A. DAVIS

Syphilitic Arthritis with Effusion. Kling, D. H., *Am. J. M. Sc.*, 1932, **183**: 538.

Kling reports in detail upon 9 cases of syphilitic arthritis occurring in a series of 112 cases of acute and chronic arthritis with effusion. In 7 instances the disease was manifest as a simple synovitis. In the eighth it was combined with a juxta-articular gumma and in the remaining case with osteochondritis and periostitis. The disease was found to be most frequent in children and young adults.

The important clinical features are the high frequency of involvement of one or both knees alone, and the insignificance of pain, muscle spasm and periarticular thickening. The most important evidence is probably the positive Wassermann reaction in the fluid from the affected joint. The skiagram is of little help in diagnosis as the articular surfaces are seldom involved. The therapeutic test serves to confirm the diagnosis. In non-specific cases there is no response, but in the luetic synovitis there is a prompt and complete response to full doses of antiluetic drugs. Where destruction of the joint is advanced the results of treatment are naturally disappointing.

E. S. MILLS

SURGERY

The Pathogenesis of the "Strawberry" Gallbladder. Elman, R. and Graham, E. A., *Arch. Surg.*, 1932, **24**: 14.

The gross appearance of the mucosa in this condition is striking, with the small yellowish spots like sand on the surface. About one-fifth of all types of diseased gallbladders removed at operation have this appearance. Boyd published the first detailed pathological study in 1922, demonstrating the lipoid nature of the white or yellow deposits seen with the naked eye. He also showed by histological and chemical means that these lipoid deposits were cholesterol.

Elman and Graham have obtained evidence in the laboratory of the Department of Surgery, Washington School of Medicine and Barnes Hospital that seems to show that (1) the gallbladder does not absorb cholesterol; (2) it has the power of excreting cholesterol; (3) inflammation may accelerate this excretion. Obviously these deductions have a bearing on the problem of the pathogenesis of "strawberry" gallbladder.

It is difficult to explain either the development of the "strawberry" gallbladder or the storage of cholesterol on the basis of absorption of cholesterol. On the other hand it is relatively easy to explain "the strawberry" gallbladder on the basis that cholesterol is excreted by its mucosa, particularly in the presence of inflammation. Sufficient evidence has been adduced, it is believed, to indicate that this is a normal phenomenon. Elman and Graham found this to be true in their own experiments, while it has long been known that inflammatory exudates are rich in cholesterol. Inflammation of the wall of the "strawberry" gallbladder can usually be demonstrated. In these cases there is more cholesterol in the bile. The storage of cholesterol under the mucosa is thus easily explained, when the bile for some reason is unable to take up any more of it. Infection is undoubtedly the most important factor in the pathogenesis of the "strawberry" gallbladder.

G. E. LEARMONTH

Cancer and Weight. Lund, C. C., *Arch. Surg.*, 1932, **24**: 145.

This interesting study on 475 proved cases of epidermoid carcinoma of the cervix uteri and 79 cases of adenocarcinoma of the cervix and of the uterus from the Huntingdon Memorial Hospital and Department of Surgery, Harvard Medical School, deals with the relationship of diet and weight to cure of the disease with radium treatment. During the past twenty years the influence of diet on

cancer has been intensively investigated by experimentation on animals and as a result, it has been found that either certain vitamin deficiencies or low caloric diets will delay or prevent the taking of transplants of nearly all the transplantable tumours. After the transplant is established dieting has no effect on many tumours and a comparatively insignificant one on others.

There are some data which indicate a possible relationship between bodily nutrition and the etiology of cancer. Statistics show that people who are overweight when they take out life insurance are more liable to die from cancer than others who are of normal weight. Those who are underweight have a reduced liability. It is possible to determine from the data of hospital records, the relationship between the patient's weight and the prognosis of the disease. In making estimates Lund followed these standards of suitability: (1)presence of clinical carcinoma of the cervix or of the uterus proved by pathological examination at the time of the first treatment without radium; (2) record of the patient's weight on first entry; (3) known survival for five years or death from clinical cancer in less than five years; (4) treatment with radium; (5) no subsequent radical operation.

Of the 475 patients with epidermoid carcinoma of the cervix, it is definitely shown that the greatest percentage of cures occurred in those who were of middle weight, and there is no doubt that the prognosis is more favourable for the more normal than for the fat or the thin ones. The results in the 79 patients with adenocarcinoma of the cervix or fundus uteri are different from those shown for cases of epidermoid carcinoma of the cervix. No difference in the groups of different weights is shown if those who survived for five years are considered as a whole. There is, however, a marked variation in the group of patients who were overweight; so many who were considered cured were alive and diseased or were dead from the disease after the five year period that the patients actually alive and well for more than five years were hardly 50 per cent of the corresponding number in the patients who were of middleweight.

This series of patients is so small that the findings may be fallacious. In addition, radium was used in all cases, no matter how favourable the disease was for operation, and one-half of these cases involved the fundus uteri. Obesity was the commonest contraindication to operation in the less advanced cases. There is therefore a definite but less marked relationship of weight to prognosis.

G. E. LEARMONTH

Thyroiditis. Clute, H. M. and Lahey, F. H., *Ann. Surg.*, 1932, **95**: 493.

Thyroiditis is a relatively frequent finding. It may be divided: (1) simple thyroiditis, (a) primary, (b) secondary; (2) suppurative thyroiditis (a) primary, (b) secondary; (3) chronic thyroiditis, (a) primary, (b) secondary.

Simple primary thyroiditis is associated with a preceding infection in over 50 per cent of cases. Tenderness, swelling, pain on swallowing of food, a temperature of 99 to 100 degrees F., occasional mild symptoms of hyperthyroidism, form the signs and symptoms. The disease runs a course of 12 to 18 days. Recurrence is rare, as is the development of myxœdema. Treatment consists in rest, local applications of ice, and mild sedatives. Close watch should be kept for the development of abscess. Lugol's iodine is of value.

Suppurative thyroiditis is a more unusual condition. A preceding history of infection is present (teeth, tonsils, etc.). Chills, fever and local tenderness appear. The temperature is 102 to 103 degrees. Difficulty in swallowing is an early symptom. The gland is definitely palpable and moderately enlarged. It is extremely tender. Mild hyperthyroidism may be present. Loss of weight may be rapid and severe. If unopened, the abscess may burst spontaneously, an accident which usually results fatally. Œdema of the larynx may occur. Abscesses have been reported occurring in the course of typhoid fever, pneumonia, puerperal infection, etc. Drainage should be early and adequate.

Chronic thyroiditis may be the result of a chronic pyogenic infection, of syphilis, of tuberculosis, or be of the Riedel type. It may be the late stage of a thyroid infection which has not subsided. Twelve out of 15 cases reported were diagnosed clinically as hyperthyroidism. Later, all but two had basal rates varying from -6 to -36. Five developed myxœdema post-operatively. If chronic thyroiditis is recognized operative procedures should relieve symptoms as much as possible, establish definitely the presence or absence of malignancy, and leave as much thyroid tissue as possible.

Twenty-one cases of Riedel's struma are reported. Histologically there is a thyroiditis of extreme degree, and a marked round celled infiltration. Seven cases developed myxœdema.

STUART D. GORDON

OBSTETRICS AND GYNÆCOLOGY

Blood Guanidine Base Concentration in Eclampsia. Stander, H. J., *Am. J. Obst. & Gyn.*, 1932, **23**: 373.

Parathyroidectomy in animals is accompanied by retention of guanidine in the blood. An increase in blood guanidine concentration has also been found in active tetany in children and

in arterial hypertension. During the past three years routine guanidine determinations on the blood of eclamptic patients have been made in the Department of Obstetrics, Johns Hopkins Hospital and University. The author's conclusions are: (1) blood guanidine is not markedly elevated in eclampsia; (2) hypoglycæmia is not a usual accompaniment of eclampsia; (3) intravenous administration of guanidine in the rabbit, in doses ranging from 0.05 to 0.25 gm. per kilogram of body weight, does not produce liver necrosis; (4) calcium therapy in eclampsia does not appear rational on the basis of blood guanidine, blood sugar or blood cation ratios.

ROSS MITCHELL

Pregnancy and Labour Complicated by Fibroid Tumours. Watson, B. P., *Am. J. Obst. & Gyn.*, 1932, **22**: 351.

Women with fibroid tumours of the uterus are less fertile than those who have none, while women who have had children are less liable to develop fibroids than those who have not borne children. In addition to causing sterility, fibroids are apt to lead to abortion, miscarriage and premature labour. While fibroid tumours may constitute a major complication of pregnancy, labour and puerperium, the smaller tumours usually permit the patient to proceed to term and deliver normally or with ordinary obstetric assistance. Every patient with fibroids of significant size requires careful watching and guiding during her pregnancy. The most frequent complication during pregnancy is red degeneration. While in some instances symptoms of this may be so acute as to necessitate surgical intervention in the course of the pregnancy, in the majority of cases the patient can be carried to term and delivered by Cæsarean section followed by myomectomy or hysterectomy; or she may be delivered *per vaginam* and a subsequent myomectomy or hysterectomy done. The size of the tumour may necessitate removal before term, but in the absence of acute symptoms time should be given to see whether the abdomen will not accommodate it.

ROSS MITCHELL

The Value of the Various Kidney Function Tests in the Differentiation of the Toxæmias of Pregnancy. Stander, H. J., Ashton, P. and Cadden, J. F., *Am. J. Obst. & Gyn.*, 1932, **23**: 461.

Mosenthal, phenolsulphonephthalein, diastase, thiosulphate, urea concentration factor, urea clearance, guanidine and creatinine excretion tests were carried out on 65 patients, including 19 normally pregnant. The authors find that the last three tests proved of real value in the differentiation between mild nephritis and the other toxæmias of pregnancy. They recommend the urea clearance and creatinine excretion tests for routine use in all cases of toxæmia of pregnancy where the diagnosis is not clear. A urea clearance of below 80 per cent of the mean normal, and a creatinine excretion below 155 mg. in the first hour, are strongly indicative of renal damage.

ROSS MITCHELL

PÆDIATRICS

Pulmonary Diseases: 5,816 Cases in Children, with Special Reference to the Childhood Type of Pulmonary Tuberculosis. Stewart, C. A., *Am. J. Dis. Child.*, 1932, **4**: 803.

This report is a survey of 5,816 children studied at the Lymanhurst School for Tuberculous Children in Minneapolis; 3,981 children (68.4 per cent) were Pirquet-positive and 1,835 (31.6 per cent) were Pirquet-negative.

The author uses the term "childhood tuberculosis" to designate the diffuse and focal lesions in the lungs and adjacent tracheobronchial nodes that result from the first infection of the pulmonary tissue by the tubercle bacillus. He describes, from their appearance on roentgen examination, three stages in the evolution of the disease produced by the primary tuberculous infection: (1) resolving parenchymal consolidations—early stage of the disease; (2) intrathoracic glandular calcifications—late permanent stages of the disease; (3) Ghon tubercles associated with hilar gland calcifications—late and permanent stages of the disease. Of the entire group of 5,816 children studied roentgenologically, 20.3 per cent revealed intrathoracic disease; 3.6 per cent showed lesions not of the childhood tuberculosis type; calcified hilus glands were found in 10.4 per cent; and the lesions of childhood tuberculosis were discovered in 16.7 per cent if questionable and slight calcifications are included, or in 8.5 per cent, if these are excluded. 82.3 per cent of those showing intrathoracic disease were classified as cases of childhood tuberculosis.

In the group of negative Pirquet reactors, 3.9 per cent showed roentgenological lesions diagnosed as childhood tuberculosis, whereas in the Pirquet-positive group the diagnosis was made in 44.5 per cent. If questionable and slight glandular calcifications are excluded the ratio of childhood tuberculosis in the two groups becomes 0.58 per cent in the Pirquet-negative to 25.9 per cent in the Pirquet-positive. "If a value of 100 per cent be assigned to the Pirquet test as measuring its efficiency in the discovery of childhood tuberculosis, the roentgen examination has a reliable efficiency of about 25 per cent, and the physical examination an efficiency of a small fraction of 1 per cent."

Resolving parenchymal tuberculous lesions

were found in 3.6 per cent of the Pirquet-positive group, and not at all in the Pirquet-negative group. Questionable calcification of the hilus glands was reported four times as frequently in the Pirquet-positive as in the Pirquet-negative group; slight calcification seven times as frequently; moderate calcification 60 times as frequently; and marked calcification 42 times as frequently. Ghon tubercles were found in 5.1 per cent of the entire group, being 16 times as frequent in the Pirquet-positive as in the Pirquet-negative.

The adult type of tuberculosis was diagnosed in 0.82 per cent of the entire group, being 32 times as frequent among the Pirquet-positive as among the Pirquet-negative. The earliest age at which it was encountered was six years. Lesions of the adult type were predominantly apical, and usually showed no relation to the site of the primary tuberculous focus.

Non-tuberculous lung lesions constituted a very small group and were no more frequent in the Pirquet-positive than in the Pirquet-negative group.

This paper is an interesting and valuable contribution to the study of tuberculosis in childhood. The reviewer believes that its importance would have been greatly enhanced had the Mantoux test been routinely used rather than the less reliable Pirquet test.

A. K. GEDDES

The Detection of Presymptomatic Tuberculosis in Children. Fletcher, E., *The Lancet*, 1932, **1**: 444.

The most important period in which to diagnose tuberculosis is before the onset of symptoms, when treatment is most efficacious. Our two chief instruments in such a search are radiology and the tuberculin test. Fifty healthy children were investigated by these means, with the addition of a careful clinical examination in order to appraise the value of each method. The tuberculin test was done intradermally (Mantoux), concentrations being increased to 1:100 in non-reactors. The average age was 7.3 years. Physical signs were found to be unreliable. The tuberculin test was done in 20 cases with abnormal x-ray findings; 12 were positive, 2 cases of tuberculosis gave a negative reaction. This test is considered not sufficiently reliable to be used as a sole guide. Radiology showed 8 cases of tuberculosis, 4 being of mediastinal glands and 4 of parenchyma. The shape and extent of the shadow was no guide to its severity or prognosis. In this group of fifty "well" children the x-ray was taken to be the decisive means of separating tuberculous from non-tuberculous.

J. B. ROSS

OPHTHALMOLOGY

Arteriosclerotic Disease of the Optic Nerve. Alpers, B. J. and Wolman, I. J., *Arch. Ophth.*, 1931, **6**: 21.

Arteriosclerosis may cause a disturbance in the function of the optic nerve varying from partial disability to complete optic atrophy. This seems to be a fairly widely accepted clinical view, and yet this factor in disease of the optic nerve receives scant attention. That it is a factor of some clinical importance is indicated by a case reported by the authors in which visual disturbances were directly traceable to arteriosclerotic conditions in the optic nerves and chiasm. It is important to recognize that obscure visual disturbances of varying intensity may be caused by an arteriosclerosis which may operate in one of two ways, either by direct compression of the optic nerve, by the internal carotid arteries, or by arteriosclerosis of the vessels within the nerves and visual tracts themselves. The result may be complete optic atrophy, with total loss of vision or partial loss of visual acuity, with, or without, atrophy of the optic nerve and often with a scotoma. If the cases of visual disturbances due to aneurysm are excluded, the number of reported cases of compression of the optic nerve due to merely thickened and sclerosed internal carotid arteries are few. The pathogenesis of these arteriosclerotic visual disturbances is not always the same; there are the cases of so-called pressure atrophy. Oppenheim and Siemerling believe that in some cases the process is a primary arteritis and that compression of the nerve plays only a secondary rôle. Probably the arteriosclerosis of the small vessels within the optic nerves plays quite as important a rôle in the production of the visual disturbances as does the compression by the sclerosed internal carotid vessels. The result is a lack of nourishment of the tissues with the resulting changes, a focal loss of nervous tissue with perivascular gliosis.

In conclusion, the writers report a case of compression of the optic nerves by sclerosed internal carotid arteries, resulting in transient visual disturbances. These arteriosclerotic disturbances of the optic nerve are probably not uncommon and may be the cause of unexplained visual difficulties in cases of arteriosclerosis.

S. HANFORD MCKEE

The Retinal Changes of Arteriosclerotic Heart Disease and Essential Hypertension. Horine, E. E. and Weiss, M. M., *Arch. Ophth.*, 1931, **6**: 535.

Many papers dealing with the retina in its relation to systemic conditions have appeared in recent years, but there have been few attempts to correlate the modern concepts of heart disease with retinal changes. The newer

knowledge of cardiology has apparently escaped the notice of even the most recent authors of ophthalmological text-books. The greatest amount of confusion seems to arise from failure to realize that arterial sclerosis and essential hypertension are distinctly different entities. From the earliest days of the ophthalmoscope, the fundus changes that we now know are hypertensive have been attributed to arteriosclerosis. Ordinarily the arteriosclerotic heart is seen in the picture of an elderly person usually over sixty years of age, who presents evidence of either the anginal or congestive type of heart failure. The blood pressure is normal or lower than normal; the heart is not enlarged. Pathologically, the lesions of arteriosclerosis are confined to the arteries, and there is no striking involvement of the arterioles. In the hypertensive cardiovascular disease, elevation of the blood pressure is a striking clinical feature. It has been variously termed essential hypertension, hyperpiesia, or primary hypertensive cardiovascular disease. Apparently this condition has its beginning, in many instances, in the early thirties and makes itself manifest in the fifth decade. Essential hypertension is a disease of the small vessels, the changes apparently consist of hypertrophy of the intima, with gradual obliteration of the lumen and hypertrophy of the muscle layer of the media with replacement fibrosis.

Changes of the fundus associated with advanced essential hypertension are readily recognized. The arteriolar sclerosis of the retinal vessels is very characteristic. The arterioles are markedly narrowed, having a copperwire appearance. The arterial light reflex is accentuated, giving to the vessels a silver sheath while the tortuosity and irregularity of the lumen are striking. Compression of the veins by the crossed arterioles is considered pathognomonic. The disc is red and swollen, its margins are indistinct, there may be marked elevation. Generalized œdema of the retina is often found, scattered hæmorrhages and cotton-wool areas are present. Very often these white spots assume a stellate arrangement around the macula.

In the retinal picture of the malignant phase, there is usually distinct and generalized spastic constriction of the retinal arterioles in association with generalized œdema of the retina, hæmorrhages, cotton-wool patches, and particularly hyperæmia and measureable œdema of the disc. The papillœdema is of special prognostic and diagnostic import. The fundus of simple arteriosclerotic heart is in marked contrast; here the choroidal vessels are chiefly involved, presenting the usual picture of sclerosis. Hæmorrhages, transudates and white spots are absent, only the larger branches of the retinal vessels may show slight narrowing. The retinal vascular-sclerosis is usually progressive, and once developed is permanent. This persistence of the retinal changes resulting from hypertension is of inestimable value in the diagnosis of a type of condition that we designate as "hypertensive heart disease, without hypertension."

The terms albuminuric and nephritic retinitis are etiologically inaccurate, and should be discarded. When referring to a patient with essential hypertension, the term arteriolar sclerotic retinitis should be used in place of arteriosclerotic retinitis. Retinal arteriolar sclerosis is usually progressive and, once developed, is permanent. The persistence of retinal arteriolar sclerosis permits of a diagnosis of essential hypertension, even if the blood pressure is normal. Prognostically changes in the fundus are of definite value.

S. HANFORD MCKEE

NEUROLOGY AND PSYCHIATRY

Intracranial and Spinal Metastases in Gliomas of the Brain. Cairns, H. and Russell, D. S., *Brain*, 1931, **54**: 377.

The frequency with which intracranial tumours are accompanied by tumours or other lesions in the spinal cord has in the past been greatly under-estimated. The authors have found spinal metastases in 8 out of 22 cases of cerebral glioma in which both brain and cord were examined. Under special circumstances all varieties of glioma can give rise to metastases. No true indication of their frequency is given by clinical examination alone. Increase of protein in the spinal fluid in cases of intracranial tumour does not necessarily indicate the presence of spinal metastases. The extent of metastasis varies greatly, and is approximately proportional to the malignancy of the primary tumour. Metastases from gliomas appear to be limited to the central nervous system and to be disseminated by the cerebrospinal fluid. They occur in the walls of the ventricles or in the pia-arachnoid of the brain and cord. In the ventricles the metastases vary in size from nodules that are easily seen with the naked eye to microscopic collections of cells. Access to the ventricular system or basal cisterns is a circumstance of primary importance in their production. The only spread of relatively benign primary tumours of other parts of the body at all comparable with this appears to be that of papilloma of the bladder, or that of pseudomucinous cyst-adenoma of the ovary in the peritoneal cavity. Operation is not necessarily contraindicated when metastases are found, for it still remains to be seen whether the small metastases observed in the more benign gliomas will grow so as to produce symptoms. But in the

presence of extensive metastases, malignant gliomas are clearly not suitable for operative treatment.

FRANK A. TURNBULL

Goldsol Reaction in Disseminated Sclerosis. Rogers, H. J., *J. of Neurol. & Psychopathol.*, 1932, **47**: 205.

In this study, emanating from Kinnier Wilson's Clinic at Queen Square, an attempt is made to ascertain the present status of the laboratory findings in relation to the clinical course of this disease. An extensive review of the literature is given and in this some definite points of agreement are noted, *viz.*, that the Lange curve shows a distinct tendency to change from the former typical "paretic" curve to a "syphilitic" of zone ii curve, that normal curves occur in as high as 25 per cent of the cases, that there is no accurate parallelism between the course of the disease and the changes in the fluid, and that the fluid changes irrespective of treatment.

The investigator's own researches on more than 70 unselected cases result in the conclusion that in 25 per cent the curve is normal, in 25 per cent of the "paretic" type, and in 50 per cent variable; that there is no definite parallel between clinical course and fluid findings, and that fluid changes seem unrelated to therapy. She warns against using curve changes as an indication of the success of therapy. The difficulty at present is that an insufficient number of cases has been thoroughly investigated to allow any conclusion as to what the exact "normal" for cases of disseminated sclerosis should be.

A. T. MATHERS

PATHOLOGY AND EXPERIMENTAL MEDICINE

Viosterol and Cod Liver Oil: Comparative Observations. Prather, E. O., Nelson, M. and Bliss, A. R., *Am. J. Dis. Child.*, 1931, **1**: 52.

Since the introduction of irradiated ergosterol-in-oil about three years ago, a widespread impression has grown among the laity, and unfortunately among too many of the medical profession, that viosterol is a concentrated cod liver oil and a "substitute for cod liver oil". The important fact that cod liver oil contains two vitamins, A and D, and viosterol only one, D, is unknown to the lay public; while the physician, concentrating on the prophylaxis and cure of rickets, is likely to disregard the need of maintaining adequate supplies of vitamin A in the dietary and the importance of its influence as a factor promoting resistance to infections.

Three groups of white rats were used in the authors' experiments. Group 1 was fed a purified diet adequate in proteins, inorganic salts, calories, and vitamin B. These animals grew well for a short time, then the weight became stationary or decreased and xerophthalmia and all the reported symptoms of deficiency of vitamin A developed. Animals in Group 2 were given a similar diet with the addition of viosterol; calcium deposition in the bones was improved, but xerophthalmia and weight-loss were unchanged, and the inflammatory processes in the upper respiratory tract and other visceral changes were present to the same extent as in Group 1. Animals of Group 3 were given cod liver oil instead of viosterol, the amount given being equivalent in antirachitic value to the reputed potency of the viosterol. These animals showed excellent growth, better calcification of bones, normal respiratory tracts and viscera, and freedom from infection.

The authors conclude that viosterol does not stimulate growth and development, or prevent upper respiratory infections, or produce the same degree of bone calcification as does cod liver oil. They state in conclusion that "since colds, malnutrition, and intestinal inadequacies are more frequent in children than rickets, this study emphatically suggests that the apparently widespread substitution of viosterol for cod liver oil in the diet of the child is not logical and may result in an appreciable decrease of the child's strength and resistance to infections."

Although the authors' conclusion is based on the results of animal experiment only, there is ample evidence that vitamin A is essential to the diet. It is probable that the *supervised* diet of the infant or child contains adequate quantities of vitamin A without the addition of cod liver oil, but the wisdom of substituting viosterol for cod liver oil *generally* is open to the gravest doubt. The thesis of this article is a very pertinent one and cannot be overemphasized.

A. K. GEDDES

The Leucopoietic Value of Sulphur. Power, T. D., *The Lancet*, 1932, **1**: 338.

Injections of sulphur in oil (sulphosin) have been used for the last two years to produce an artificial pyrexia in the treatment of various conditions, especially general paralysis of the insane and dementia præcox. Unlike malaria, this artificial pyrexia is accompanied by a definite leucocytosis which increases as the treatment progresses. The author reports the results of animal experiments dealing with this leucopoietic effect. Eight rabbits were given daily injections of 1 c.cm. of sulphosin for twenty-three consecutive days. There was in all cases a rise of leucocytes during the course of injections, once reaching 25,500, with a rapid fall to normal upon discontinuing the sulphosin.

Bone-marrow studies showed a marked leucoblastic hyperplasia with some increase of erythroblastic tissues. Blood from a patient under sulphosin was also tested for its phagocytic power against staphylococci, since such patients characteristically show a shift to the left in the Schilling index. It was found that the mature polymorphonuclear leucocytes exhibited phagocytosis to a marked degree, while the more early immature forms showed comparatively little phagocytic power. No application of this leucoblastic stimulating property of sulphur to clinical problems is attempted.

J. B. Ross

The Rôle of the Placenta in Visible Icterus Neonatorum. Gottlieb, R., and Kearns, P. J., *J. Clin. Invest.*, 1931, **10**: 319.

In this report Gottlieb and Kearns add further proof to the hypothesis that icterus neonatorum is the result of erythrocytic disintegration early in infancy. In 85 cases, they have correlated the presence or absence of icterus in the children after birth with the extent of the degenerative changes occurring in the placenta. The placentæ were subjected to both gross and microscopic examination, and the infants were carefully watched for the appearance of icterus. Concurrently, the number of red blood cells, the hæmoglobin, and the bilirubin of the infants' blood were determined daily for one week starting at birth. In 40 of the 85 cases various grades of placenta changes were seen, and 31 of this group showed icterus as well as a pronounced fetal polycythæmia and hyperbilirubinæmia. On the other hand, in the 45 cases showing jaundice, 31 were associated with more or less marked degenerative lesions in the placenta. The authors conclude therefore that one of the important factors leading to polycythæmia in the newborn is pathological change in the placenta with increased "respiratory" difficulties for the fetus. And as previously suggested by Goldbloom and Gottlieb, the polycythæmia in post-natal life is responsible for icterus neonatorum.

J. Feigenbaum

HYGIENE AND PUBLIC HEALTH

Control of the Silicosis Hazard in the Hard Rock Industries. Hatch, T., Kelley, G. S. and Fehnel, J. W., *J. Ind. Hyg.*, 1932, **14**: 69.

The hazard of rock drilling in confined spaces is recognized if the rock be silicious in character. Even in quarrying and open excavations a real hazard occurs, as has been shown by Smith in connection with studies in New York of workers in subway cuts, etc. Wet drilling has not completely solved the problem. The Kelley Dust Trap is a device for removing the dust at its source—the point of the drill. The trap consists of a metal chamber designed to enclose the drill at the rock surface. It is shaped like an inverted dipper, about 6 inches in diameter at the base and about 6 inches high. It is provided with a side connection which is connected by a hose of any desired length to a central exhaust system. The effect of the device is to set up a strong negative pressure inside the chamber and immediately at the source of the dust. It is not necessary for the collector chamber to be air tight since the negative pressure, if strong enough, will prevent the dust from escaping.

The United States Public Health Service in the studies of the dust hazard in Barre, Vt., proposed a limit of 10 million dust particles per cubic foot of air as a maximum permissible concentration. With this machine, exhausting 60 cu. ft. of air per minute, a concentration below 5 million particles per cu. ft. of air was maintained.

Frank G. Pedley

Humidity and Comfort. Howell, W. H., *Science*, 1931, **73**: 453.

Many conflicting opinions on the effect of humidity have been aired in scientific journals and text-books. Certain authorities insist that the low humidity which obtains in most of our homes in winter time is associated causally with upper respiratory infections, whereas other authorities consider that the evidence on this point is insufficient to draw conclusions from. To determine statistically the effect of humidity on health is a task of extraordinary difficulty since human beings are not subject to scientific control over a period long enough to conduct a satisfactory experiment. The sensation of comfort, however, can be determined reasonably well and this has been the criterion in Howell's observation recorded herewith.

A series of observations was made upon a class in the School of Hygiene and Public Health of Johns Hopkins University exposed to varying degrees of humidity. Approximately 45 persons were involved. The lecture room was connected with an air-conditioning plant by means of which the temperature, humidity and air movement could be controlled. The temperature of the room was kept at 70° F. and the humidity varied on different days, from 20 to 60 per cent. The students were asked to record their sensations of comfort during the course of the lecture hour. About 95 per cent of the students found the classroom comfortable at 70° F. irrespective of the humidity. That is to say they voted comfortably cool, comfortable or comfortably warm. The group voting comfortably cool increased from 24 per cent to 55-60 per cent humidity to

49 per cent at 15-20 per cent humdiity, indicating that a decrease of humidity does increase somewhat the cooling power of the air but not sufficiently to produce discomfort.

The author concludes that it is doubtful whether there is any justification for the installation of expensive equipment for the control of humidity and that the dry bulb thermometer is the best single instrument for recording atmospheric conditions from the standpoint of human comfort.

FRANK G. PEDLEY

Cyanide Poisoning. Smith, A. R., *Industrial Bulletin, N.Y. State Dept. Labour,* 1932, **11**: 169.

The poisonous properties of hydrocyanic acid gas are well known. Smith says that a concentration of 100 parts per million is dangerous. The action of the gas deprives the tissues of their power to absorb oxygen. A considerable number of deaths have occurred in the process of fumigating houses and particularly ships, but in industry where cyanides are extensively used cases of industrial poisoning are infrequent, and the general impression is that the salts of hydrocyanic acid can be used with impunity. The hazard of mixing the cyanides with acid is recognized, but the possibility of chronic poisoning from exposure to the cyanides as such is not generally admitted. Smith cites 3 cases, one a machinist using cyanides for case hardening, one a gold plater and the third a case hardener. These men exhibited symptoms related to the gastro-intestinal and nervous systems. The first man became dizzy, nauseated and semi-conscious after exposure to the fumes of heated potassium cyanide. The second man was probably exposed to the fumes of HCN. He was seized with abdominal pains and convulsions which recurred on his return to work after a vacation of 10 days. The third man developed a paralysis of the arms and legs. His job was to plunge steel objects into a pot of molten KCN for the purpose of hardening them.

These three cases point strongly to hydrocyanic acid or its salts as the causative agent in a chronic disease which in one case resulted in complete disability.

FRANK G. PEDLEY

RADIOLOGY

Clinical and Therapeutic Consideration of Osteitis Deformans. Belden, W. W. and Bernheim, A. R., *Radiology*, 1932, **18**: 324.

This rare disease, first described by Sir James Paget in 1876, usually begins after 40 years of age. There is an associated softening and overgrowth of bone involving chiefly the skull, vertebræ and bones of the leg, but almost any bone may be involved. The leg bones are usually the first to be affected. These, carrying the body weight, become bent—the femur outward, the tibia forward: there is also an associated twisting of the bones. Enlargement of the skull is always present, due to an enormous deposit of bone on the outside of the cranium. Kyphosis develops in the dorsal spine. The pelvis may be broadened. X-ray changes are to be noted long before any deformity appears. There is great thickening and increased density of the bones and the vault of the skull is serrated.

The etiology is unknown. Paget considered it a chronic inflammatory condition. French workers feel it to be a late manifestation of syphilis. The ductless glands have been blamed. Hawk has demonstrated metabolic change.

The architecture of the bone is disorganized. The cortex loses its dense character. The marrow cavity is encroached upon until it is filled completely, and, occasionally there is cyst formation. The bones are soft and can be cut with a knife. The new bone is deposited from the periosteum. Differential diagnosis between localized osteitis fibrosa cystica and the generalized form, Paget's disease, is very difficult. It is felt that generalized osteitis fibrosa cystica and osteitis deformans are different manifestations of the same disease at different age periods of life and that the localized form of osteitis deformans is due to a previous infection which causes a sterile non-suppurative osteomyelitis or osteitis. The theory behind the present day therapy centres in the parathyroid gland and calcium metabolism. The regime of treatment adopted by the writers was as follows:— Viosterol, ten drops three times a day; tomato juice, six ounces three times a day; calcium lactate, grains 40 twice a day. Every two weeks, three glassfuls of milk a day were substituted for the calcium lactate. Treatment with parathyroid extract was not successful.

A. STANLEY KIRKLAND

Miliary Lung Disease due to Unknown Cause. Sayers, R. R. and Meriwether, F. V., *Am. J. Roentgenol.,* 1932, **27**: 337.

The article describes 125 cases found in 18,000 examinations in the zinc and lead mining areas at Picher, Oklahoma, ranging in age from 20 to 65 years, the greater number in the age-group from 20-30. With the exception of one Indian, all were native-born white Americans. The majority were born and reared in the vicinity of the mining field. Family histories and personal histories were not abnormal. Fifty-four decimal four per cent of the cases in this group had been farmers from sec-

tions producing wheat and hay; 65.6 per cent of these subjects had no symptoms. The most common symptoms were dyspnœa, cough and the expectoration of blood-tinged mucus. The symptoms remain stationary or tend towards improvement. Physical examination showed that 87.2 per cent were apparently healthy and 65.6 per cent were robust. Pulse, respiration and blood pressure were normal. Eight per cent showed some dullness. Räles were found in 23.2 per cent. X-ray findings included the finding of a large number of discrete, dense, shot-like spots scattered over both lungs with enlargement of hilus shadows and calcified spots in the hilus. Eighty-eight of these cases had had careful laboratory studies. Two cases showed tubercle bacilli, 7 had four-plus Wassermann reactions. Blood counts were negative. In one case a fungus was found in the sputum and 30 cases following that all showed a fungus. Two types were identified as *Aspergillus fumigatus fisheri* and *Aspergillus niger*. Antigens were prepared and dermal tests were made, in all cases tested with the antigen of *Aspergillus niger*, the reaction was strongly positive; with the antigen from the other type, the reactions were negative.

A discussion of differential diagnosis embracing miliary tuberculosis, calcium metastases, pneumomycosis and pneumoconiosis is elaborated and the suggestion is put forth that these miliary calcifications may be due primarily to fungus infections. The appended discussion is worth reading.

A. STANLEY KIRKLAND

Obituaries

Dr. Duncan Nevan Carmichael, Peterboro's oldest physician, died at his home on April 13, 1932, in his 78th year. Dr. Carmichael was born in the township of Mariposa, Victoria County, and graduated from Trinity Medical College in 1884. He was L.R.C.P. Edinburgh (1884). For eight years he practised medicine at Mount Pleasant and then came to Peterboro where he has been a leading physician for 40 years. He leaves besides his widow, two sons, and one daughter, all of whom are doctors.

Dr. Christian Neils Gundesen (McGill, 1923), died at Calgary on April 20th at the age of thirty-three years. He was born in the United States but had spent most of his life in Canada. Following his graduation, he had one year's hospital internship, then began practice at Wetaskiwin, Alberta, where he remained until 1931, when owing to progressive ill health he became a patient at the Provincial Sanatorium at Keith. He left a widow and two young sons.

Dr. Donald Mackintosh, of Pugwash, N.S., died on February 10, 1932. He was born October 26, 1846, at Springville, N.S., a son of John Mackintosh and Mary McKenzie. From the Pictou County Schools he entered the Dalhousie Arts Course, in 1867, taking but one year in Arts. He entered in May, 1868, the first class of the Halifax Medical College and was for some years the only surviving member. He shortly after transferred to Harvard from which he graduated in 1871.

Doctor Mackintosh began practice in Stellarton and after three years put in a term at the Royal Infirmary where Lister was then developing his theory of antisepsis. In 1873 he obtained his L.R.C.P. Returning, he practised in Stellarton for another three years, then at the solicitation of a friend he started for British Columbia. Passing through St. Louis he stopped to see a friend and was persuaded to stay in Evansville. However, after two years he suffered repeated attacks of malaria and was forced to return home. He located in New Glasgow, but in a short time in 1879 he located in Pugwash where he practised continuously until a year before his death.

Doctor Mackintosh was an ardent attendant upon medical society meetings both local and provincial. On July 5, 1899, he was elected President of the Medical Society of Nova Scotia.

His wife, formerly Miss Sara H. Corbett, predeceased him by a number of years, and he is survived by a daughter at home and one son, Dr. A. E. Mackintosh, of Amherst.

Dr. F. A. Nordbye died at St. Mary's Hospital, Camrose, Alberta, on March 21, 1932. He was born in Urskog, Norway, on May 7, 1880, and eight years later emigrated with his parents to Montevideo, Minn. When he was eleven years old his father died. Nevertheless by the indomitable courage and perseverance that always characterized his efforts he became first a pharmacist and later graduated in medicine from McGill in 1908. He interned at Bethesda Hospital, St. Paul, Minn., then practised medicine at Rolette, N. Dak. and Wetaskawin, Alta. from 1910 to 1914. During the later year he moved to Camrose. Here he built up a wonderful practice, but always gave freely of his time as chief of the public library, chairman of the school board, member of the masonic lodge, Order of the Eastern Star, Sons of Norway, and Camrose Rotary Club. As Norwegian Vice-consul for the Province of Alberta he spent much time and money in the interests and welfare of the Norwegian newcomers. He was a lover of the "Old masters", both in art and books, and his collections in these are very noteworthy. An everlasting admirer of Sir Wm. Osler, he ardently strived to follow the teachings of the master.

Dr. Nordbye is survived by his wife and two sons Harland and Robert.

Dr. Thomas J. O'Hara, of London, Ont., died on April 23, 1932, after an illness of five weeks. For two years he had been a member of the staff of the Queen Alexandra Sanatorium. A native of London, the son of Thomas and Elizabeth O'Hara, Doctor O'Hara received his early education in St. Peter's School. He later attended Central Collegiate, and in 1929 graduated from the University of Western Ontario.

Besides his parents, he is survived by two brothers, Robert and Marcus of London; and three sisters, Mrs. Paul J. Brindell, of Kansas City, Mrs. H. C. Dederichs, of Los Angeles, Cal., and Miss Pauline, of London.

Dr. Frank D. Walsh, one of Guelph's oldest and best known medical practitioners, died in that city on April 8, 1932, after a week's illness. He was in his 64th year. Doctor Walsh had been practising continuously in this city since 1894. A native of Puslinch township, he spent almost all his life in this district. He graduated

from Bellevue Hospital Medical School in 1890. Doctor Walsh practised for a short time in Marion, Indiana, and later in Sault Ste. Marie, Ont., coming to Guelph in 1894. He never married and is survived by three brothers.

Colonel F. E. Watts. Following a month's illness in Christie Street Hospital, Toronto, the death occurred on April 12, 1932, of Colonel Dr. Frederick Earle Watts of the hospital staff. He was in his fifty-second year. He was a graduate of Toronto University (M.B., 1904). Well known in Toronto as a medical practitioner, Colonel Watts was a member of the Canadian Army Medical Corps. He served overseas with the 4th General Hospital. Surviving are his widow, Edith E. Wilson, and one son, David, 6 years of age.

News Items

Great Britain

The Osler Club.—At a meeting of the Osler Club held in London on April 15th, Dr. Geoffrey L. Keynes read a paper on Robert Boyle, illustrated by his works and portraits. A copy of Boyle's bibliography by Dr. John F. Fulton of New Haven, Conn., (late treasurer of the Osler Club), was on view. A spirited discussion followed in which there took part Professor H. H. Woollard, Dr. Mervyn Gordon, C.M.G., F.R.S., Dr. J. D. Rolleston, Mr. W. R. Dawson, F.R.S.E., and Mr. W. R. Bett.

Lectures to Nurses.—On April 8th, Prof. D. Fraser-Harris, M.D., F.R.S.E., gave a lantern lecture to the Nursing Staff of the East London Children's Hospital on "The place of Burke and Hare in medical history." The lecturer's humorous and dramatic delivery and his excellent lantern slides were greatly enjoyed by all present. Prof. Leonard Findlay, M.D., M.R.C.P., Senior Physician to the Hospital, who occupied the Chair, expressed his pleasure at this pioneer series of lectures, intended to relieve the medical boredom of the nurse's life and from the intellectual point of view make her part of the profession of medicine. Sir Buckston Browne, F.S.A., F.R.C.S., Mr. W. R. Dawson, and Mr. H. P. Winsbury-White, F.R.C.S., briefly spoke in the discussion.

Alberta

During recent months much attention has been focussed on the Great Bear Lake region, far to the north of Alberta, where large deposits of pitchblende have been found. As this valuable radium-bearing ore might be subject to foreign exploitation, the Council of the College of Physicians and Surgeons of Alberta at a recent meeting, discussed such possibilities and proposed the following resolution, which was forwarded to the federal government, through the premier, the Hon. R. B. Bennett, and to the provincial government through Premier Brownlee.

"Whereas the ravages of cancer are annually taking a large toll of human life, and

"Whereas radium has been found a great therapeutic and palliative remedy for certain types of cancer, as well as of much benefit for pre-operative and post-operative treatment of cancer cases, and

"Whereas at the present time, a European-African radium syndicate controls the world's developed supply and thus fixes the price of radium, and

"Whereas the said syndicate prevents Canada getting a supply of radium from other than its American agent, and at a price over 25 per cent higher, than that prevailing in Great Britain, thus limiting the supply for Canada, and

"Whereas it now appears that the pitchblende deposits of the Great Bear Lake District have a very rich radium content, the development of which should greatly reduce the price of radium, thus making it available for the benefit of humanity at a lower cost than now prevailing, and,

"Whereas it is definitely reported that efforts are being made by foreign commercial interests to obtain control of Canada's pitchblende deposits which, if successful, will naturally restrict the sale and use of radium to the detriment of suffering humanity, therefore, be it resolved:—

"That the Council of the College of Physicians and Surgeons of Alberta strongly urge the Federal Government to take immediate steps to prevent Canada's prospective supply of radium from falling into the hands of a foreign monopoly, in order that our Government may control the development and sale of radium, thus assuring the people that its benefits may be available at a reasonable cost."

The Alberta Rural Municipalities Act has been amended by the recent decision of the Court of Appeal thus clarifying the situation. By this decision, a physician can collect his fee for a first call to an indigent resident, and further, any member of a rural council can issue a written authority to the physician to continue his professional services in the case at the expense of the municipality.

The town of Wetaskiwin has for many years been in need of better hospital accommodation. Recently the municipal authorities decided to have a community hospital which will serve not only Wetaskiwin but the rural municipality of Montgomery as well. There will be an administrative Board of six representatives, three from the town and three from the municipality. The Provincial Department of Health has been consulted and certain hospitals visited in order that the building may be modern in every respect.

Recently a complaint was forwarded to the Council of the College of Physicians and Surgeons of Alberta, charging that a call to a maternity case in the country had been refused by a physician who stated that he would go on condition that his fee was guaranteed by the local municipal council, since the patient was an indigent. On investigation it was learned that the local medical officer of health suggested to the councillor that he would like to meet the municipal council and discuss whether or not some arrangement could be made whereby a reasonable fee would be paid by the council for indigent maternity cases. The councillor informed him that it would be a waste of time to discuss this question with the council. In the meantime another physician had been called, so he decided to attend the case at once, and, while preparing for the journey, received a message stating that a councillor had agreed on behalf of the council to pay the required fee. Subsequently the account was presented to the council and payment was refused. This only shows the great difficulties under which rural physicians are labouring. If rural councils would assume the obligations placed on them by the provincial government for the care of indigents, physicians would feel that the burden of financial need would be lightened, since in these times the difficulties are great in obtaining recompense from other patients.

G. E. LEARMONTH

British Columbia

General satisfaction is expressed that the proposed act to incorporate the chiropractors in British Columbia was thrown out in committee. Upon this occasion the medical profession had not taken any steps to oppose the measure, so that the result was, if anything, more gratifying. It is stated that the chiropractors had spent $25,000 in their campaign. The act had passed the first and second readings and it was generally believed that it would be enacted, when it was defeated by one vote.

The elections of the College of Physicians and Surgeons held recently saw most of the members of Council re-elected. In Victoria, Dr. H. E. Ridewood replaces Dr. Forrest Leeder, and in Vancouver, Dr. J. A. Gillespie replaces Dr. G. E. Seldon. Otherwise the Council remains the same.

In Victoria on April 20th an irregular practitioner was ordered to refund fees collected from a patient, amounting to $174, for treating her eyes. The method of treatment was the use of the radion in conjunction with the electric quantometer, by which electrons are given off into a glassful of water, which the patient then drinks. The treatment was supposed to be of use in correcting lenticular or corneal astigmatism. Medical evidence showed that the machine was apparently the Abrams device.

The annual elections of the Vancouver Medical Association saw no changes in the executive, all the officers being re-elected.

Plans for the Summer School of the Vancouver Medical Association are well advanced. The school will be held September 13th to 16th. Dr. F. R. Miller, F.R.S., will be one of the speakers.

C. H. BASTIN

Manitoba

Some two months ago a meeting was held of representatives of the Manitoba Medical Association and of the Union of Manitoba Municipalities to discuss the changes in the Municipal Act regarding municipal doctors. As a result complete understanding was reached and changes were drafted in the Municipal Act which have recently been approved by the Manitoba Legislature. The Municipal Act as amended provides that a three-fifths majority of the electors is necessary to effect a change in the existing state of affairs, instead of a bare majority as formerly provided. Another provision is that where a vote on municipal doctors scheme is taken in a municipality which already has a resident physician, the electors shall have the opportunity of declaring on the ballot whether, in the event of a change to the municipal doctor system, the resident physician shall receive the appointment. A third provision is that no further vote on the municipal doctor scheme shall be taken until three years have elapsed. This provides for greater security of tenure. The fourth provision is that all contracts shall be made on standard forms drawn up by the Department of Public Health and that the contract shall be subject to approval of the Board of Health. The standard form of contract provides for two weeks' holiday in each year, with an additional two weeks every second year for purposes of post-graduate study. A municipal doctor is also to be allowed to attend the annual meetings of the Manitoba Medical Association and all the meetings of the local district medical association.

In March, 1931, Mr. Pratt, M.L.A., for Birtle, introduced into the local House a resolution calling for an investigation into preventive medicine, municipalization of medical and hospital services, logical health areas, health insurance, and other practical methods for the more equal distribution of the cost of illness, public medical services, and practical methods for making special required methods of diagnosis and treatment of diseases more readily available. A special select committee was appointed to inquire into the matters mentioned and their report has been presented. The committee finds that in Manitoba the distribution of population forms three distinct areas: 1st. Greater Winnipeg, with readily available medical and hospital attention and 1 doctor for every 900 of population; 2nd, the rest of the organized part of the province in which a good type of medical and hospital service is available, provided the individual has sufficient funds to pay for these services, with 1 doctor for every 2,000 of population; 3rd. the disorganized and unorganized territory in which medical and hospital service are not readily available, and where poor roads and great distances handicap the few resident doctors. In this area the majority of residents would be unable to pay for the services if they were available and there is one doctor for every 5,000 population. The evidence submitted to the committee agreed on the general principle that the cost of illness should be provided for in advance of illness and the cost should be so distributed that it bore equitably upon all. The committee was of the opinion that in Greater Winnipeg and in the larger towns of Manitoba some form of health insurance appeared to be the best solution, while in many rural areas a scheme of municipalization appeared feasible.

The committee recommends that a commission be appointed by the Lieutenant-Governor in Council to consider the health needs of the province as a whole and to formulate a plan on a sound actuarial basis whereby health service will be available to every resident of the province at a reasonable cost which should be provided for in advance and distributed equitably. That in the formation of any plan for provincial health service the feasibility of municipalization in rural areas and health insurance in urban areas be considered; and that as far as possible tne right of a district to choose its type of local health service and the right of the individual to choose his physician be recognized. That the Commission consist of three members, one representing the public generally, one the medical profession and one the Union of Manitoba Municipalities, with power to secure the necessary actuarial assistance.

Dr. A. P. Hart, senior Demonstrator in Pædiatrics, University of Toronto, and Dr. G. S. Foulds, senior Demonstrator in Clinical Surgery, University of Toronto, made a tour of the province from May 2nd to May 7th. They addressed meetings at Morden, Ninette, Souris, Hamiota, Brandon, Dauphin, Winnipeg and Portage la Prairie. Doctor Hart spoke on "Intestinal infections in children," and Doctor Foulds on "Infection of the genito-urinary tract—diagnosis and treatment." The executive committees of the Manitoba Medical Association and the Winnipeg Medical Society held a dinner at the Manitoba Club on May 6th in honour of the visiting doctors.

The prizes and medals for term work during the 1931-32 session of the Medical Faculty of the University of Manitoba were presented on May 5th. Dr. M. J. Omerod gave the address.

ROSS MITCHELL

New Brunswick

Fire destroyed the home of Dr. Herbert L. Logan, of Salisbury, on April 17th. The fire occurred after midnight and the family had a narrow escape for their lives. The Doctor lost his entire house furnishings, including his library and instruments.

The Saint John Medical Society elected officers for the year as follows: *President,* Dr. O. B. Evans; *Vice-president,* Dr. Jos. Tanzman; *Secretary,* Dr. J. P. McInerney; *Treasurer,* Dr. Mayes Case.

The governing body of the Saint John Infirmary have informed the public that in the near future they will change the name of that institution to Saint Joseph's Hospital.

It has been arranged by the Women's Hospital Aid for the Saint John General Hospital to provide a fund to pay for blood transfusions when required for indigent patients.

Under the direction of Lt.-Col. G. G. Corbet, D.M.O., M.D. Number 7, an instructional course was held during the past winter, the result of which was successful qualification for the rank of Captain in the R.C.A.M.C. of Drs. R. M. Pendrigh, D. W. Porter, W. O. McDonald, R. T. Hayes, R. W. Grant, Jos. Tanzman and A. McM. Clarke. At the same time, Dr. A. S. Kirkland of Saint John, qualified for his majority.

The medical lecturers for this course were Drs. G. G. Corbet, R. A. Hughes, A. S. Kirkland, H. Bustin and A. B. Walter. It will thus be seen that medical affairs in the militia in this part of the province are in a flourishing condition. A. STANLEY KIRKLAND

Nova Scotia

The Minister of Health for the Province, Hon. Dr. G. H. Murphy, introduced his Housing Bill in the Legislature. The bill is designed to deal with the housing situation, reported as quite serious in some sections of the province. The chief aim of the bill is to stimulate the building of sanitary low-cost living quarters. One clause in the bill requires the appointment of a Nova Scotia Housing Commission, the members giving their services free. This commission is to study the housing situation throughout the province, and to suggest remedial measures where conditions are such as to affect the public health. It is further proposed that the commission consult with municipal councils and boards of health, but that no actual program be carried out without the approval of the authorities concerned. The bill embodies many of the recommendations of the report on housing contained in a report of Dr. S. H. Prince and his committee. This bill has been passed by the local legislature.

Dr. John Stewart, for many years Dean of the Faculty of Medicine at Dalhousie University, has resigned and Dr. H. G. Grant has been appointed in his stead. Doctor Grant also succeeds the late Dr. W. H. Hattie as Professor of Public Health. The new Dean has had wide experience as an administrator and teacher. After graduating he proceeded to London where he studied at University College, and St. Bartholomew's Hospital and qualified for the conjoint diploma of the Royal Colleges of Physicians and Surgeons. From 1921-25 he was lecturer of Medicine at Dalhousie University. He resigned from his lectureship to become a special member of the International Health Division of the Rockefeller Foundation. In 1926 Doctor Grant took charge of the Bureau of Malaria Control, as well as being supervisor of the Bureau of Epidemiology in Virginia.

Dr. M. B. Whittier, who has been connected with the Maritime Home for Girls at Truro for the past two years, proposes to go to India to join the Central India Mission.

Dr. M. D. Morrison of the Workmen's Compensation Board has been re-elected president of the Nova Scotia Historical Society, and Dr. M. A. B. Smith has been re-elected vice-president. N. B. DREYER

Ontario

In a luxurious staff room, in what is perhaps the most up-to-date hospital in Canada, built and endowed with several hundred thousand dollars from moneys left by a remarkable physician, the late Doctor Douglas of Fort Erie, Welland County Medical Society held its first meeting on the evening of March 4, 1932, under the presidency of Dr. Harry Emmett, of Fonthill. Although the roads were almost impassable because of an ice and sleet storm, twenty-two members of the profession gathered to listen to a very interesting talk delivered by Dr. E. J. Trow, of Toronto, on the diagnosis and treatment of common skin infections. At the close of the meeting it was arranged to have the County Society meet three times a year at Fort Erie, rather than hold all the meetings in the County Town of Welland. Would that the dear old doctor, who practised his profession in the district for almost sixty years, could have been present in the flesh to receive the real heart-felt thanks of the younger men who have taken up the torch from his failing hands!

The monthly meeting of the Hastings and Prince Edward Counties Medical Society was held in the Belleville General Hospital on April 8, 1932. Dr. R. G. Armour, of Toronto, gave a splendid address on medico-legal cases and the giving of evidence in court. There were present Mr. Donnan, Crown Attorney, and Major Ponton, Barrister-at-Law, who led in the discussion which followed. The opinion was held that there should be a closer relation between law and medicine, and the suggestion was made that the lawyers and doctors of this district hold a joint meeting once a year for discussion. The meeting was very instructive and much appreciated by the members.

On March 26th, on the completion of sixty years of the practice of medicine, a banquet was tendered to Dr. William Waugh who has been associated with the Medical Faculty of the University of Western Ontario since it was first established. Doctor Waugh graduated from McGill University in 1872 as silver medallist and had as his class-mates the late Sir William Osler and Dean Frank Shepherd, of Montreal. He was one of the original group who met in the Tecumseh House in May, 1881, to organize the Medical Faculty in connection with Western University, and was chosen as Professor of Anatomy and later as Professor of Surgery. For thirty years he was a member of the Faculty. In 1912, he was made Emeritus Professor of Surgery and Bursar of the University. In 1929, the degree of LL.D. was conferred upon him by Western University. Dr. W. A. Jones, of Kingston, Professor of Radiology at Queen's University, attended the banquet and extended greetings to Doctor Waugh from the Canadian and Ontario Medical Associations.

At the meeting of the Board of Directors of the Ontario Medical Association on April 18th, a committee of eight members was appointed to act in an advisory capacity to the Royal Commission on Cancer

with regard to the development of plans which the Ontario Government may undertake looking to the further investigation and study of the problem of cancer. The committee is composed of Drs. W. S. Lyman, of Ottawa; G. Stewart Cameron, of Peterborough; H. Wookey, of Toronto; Geo. A. Ramsay, of London; L. J. Austin, of Kingston; E. R. Secord, of Brantford; J. K. McGregor, of Hamilton, and T. C. Routley, of Toronto. This committee is anxious to receive suggestions from members of the profession in Ontario.

The first annual meeting of the Ontario Conference of the Catholic Hospital Association was held in Ottawa on April 5th. J. H. ELLIOTT

General

Canadian and American Physicians' French Spa Tour.—The party will leave New York on July 15, 1932, on the *S.S. Lafayette*, landing at Havre on July 23rd. There will be no customs formalities for members of the group. A special train will carry the members of the group to Paris and the entire party will be transported to the Hôtel Continental in Paris.

Sunday, July 24th and Monday, July 25th, will be spent in Paris. Leaving Paris on Tuesday, July 26th, the party will proceed by special train with wagon restaurant car and baggage car for Strasbourg. A special train will be at the disposal of the group throughout the entire trip. The travelling will be done entirely by daylight and meals will be served en route.

Between July 26th and August 20th the following cities, spas and watering places will be visited: Strasbourg, Contrexéville, Vittel, Evian-les-Bains, Aix-les-Bains, Avignon, Nice, Grand Corniche, La Turbie, Menton, Monte Carlo, Monaco, Cap D'Ail, Beaulieu, Villefranche, Cagnes, Antibes, Cap D'Antibes, Juan-les-pins, Cannes, Marseilles, Carcassonne, Luchon, Superbagneres, Biarritz, St. Jean de Luz, Dax, Hossegor, Vichy, Paris. On Saturday evening August 20th, the party will arrive in Paris and remain there until Wednesday, August 24th, when departure will be made from St. Lazare Station for Havre, returning on the *S.S. Paris*, arriving in New York on Tuesday, August 30th.

Throughout the trip, first class accommodation will be provided, with the entire party always at the same hotel. In the cities where Spas are visited, an official reception, banquets, a lecture by a professor of medicine, evening at the theatre, automobile trips in the neighbourhood, etc., will be held.

The accommodations, meals, automobiles, luggage and other details connected with the trip, will be arranged and carried out by the representatives of the French Government. Each member participating in the trip is required to pay 935 dollars (American money). This is the total expense for the trip, so far as the member is concerned. Physicians may, if they so desire, be accompanied by their families.

For information or registration please communicate with Dr. Léon Gérin-Lajoie, 1414 Drummond Street, Montreal.

There are people who entertain a high opinion of themselves, but those more particularly who are the least worthy. Each considers himself the Centre of the Universe and destined for an exalted position. Hope undertakes rashly, and Experience renders it no assistance. Vain Imagination finds an executioner in Reality, who undeceives it. Everyone should know his proper sphere of action and his fittest condition. Reality would then be the regulator of Self-Opinion—*Proverbs* of Gracian.

Book Reviews

The Normal Child: Its Care and Feeding. Alan Brown, M.D., Professor of Pædiatrics in the University of Toronto, etc. Third edition, 263 pages, illustrated. Price $1.35. McClelland and Stewart, Toronto, 1932.

The third edition of this popular book will be welcomed. Many revisions and additions have been made to bring it up to date. The chapters on Teeth and Tooth Development and on Discipline, Education and Habit Formation have been rewritten. In a simple forceful style the author presents his views on the management of children from birth throughout childhood. Emphasis is laid throughout on a constructive program of habit training. Much attention is given to the feeding of infants and older children; there is a twenty-page chapter on methods of preparing common foods. The sections on Travelling with a Baby, on Discipline and Education, and on Sleep, Rest, Exercise and Play in Older Children are especially valuable. The subject is treated so comprehensively in these twenty-four chapters that the mother and the nurse should find here a reliable guide in the management of infants and children. The book is well indexed.

An Index of Treatment. By various writers, edited by Robert Hutchison, M.D., F.R.C.P., Physician to the London Hospital. Tenth edition, revised. XVIII and 1027 pp., 93 illustrations. Price $14.00. Macmillan Co., of Canada, Toronto, 1932.

When a book reaches ten editions in twenty-four years it needs no aid from a reviewer. It is *hors concours*. This well-known Index of Treatment has been revised in part and certain subjects of importance have been added, such as Anæsthesia for Children, Diabetes in Childhood, Erythræmia, Glandular Fever, Pink Disease, Serum Sickness, Protein Shock and Blood-letting. An imposing array of collaborators, ninety in number, including many of the best known authorities in Great Britain, ensures that the information supplied is authoritative and trustworthy. A brief introduction by the Editor, couched in his own racy style, is replete with wisdom, and could be taken to heart by most medical men. No attempt is made to cover the subject of therapeutics exhaustively. As it is, the book is a large one. But the treatment advocated in the various sections is the simplest at hand and represents the studied opinion of the writers as to what is best. Major operations are not dealt with or those requiring special skill, but minor and emergency surgery, such as may confront any general practitioner at any time, are considered adequately. Electrotherapeutics and radium therapy are dealt with at some length, and also hydrotherapy. Health resorts are also considered. The subjects are arranged alphabetically and cross-indexed, so that convenience is not forgotten. The Index is admirable of its kind; in fact it could hardly be surpassed. Every busy practitioner should have it.

Chest Disease in General Practice. Philip Ellman, M.D., M.R.C.P., Physician in charge of the Tuberculosis and Chest Clinic, County Borough of East Ham. 266 pages, illustrated. Price 15s. H. K. Lewis, London, 1932.

This volume is an excellent addition to the "General Practice Series." The specialist who attempts to cover his field in a manner suited to the general practitioner encounters certain obvious difficulties. These Doctor Ellman has overcome admirably. The book is definitely for the practitioner and written with an insight into the problems of pulmonary disease as presented to the ordinary physician. Its scope is

"pulmonary" rather than "chest", inasmuch as cardiovascular conditions are not included, but there is no narrowness in the manner in which the lung diseases are brought into relation with extra-pulmonary and extra-thoracic medical conditions. The theme is tuberculosis, dealt with in its broadest concepts of inter-relation with general medicine and public health, and in its smallest details, even to the inclusion of prescriptions for cough. A sane attitude is preserved; proved ground covered with definite statements of fact and fallacy, developing or controversial fields (BCG, diet, etc.) are discussed in an unbiased and informative fashion. There is perhaps a slight vagueness in the attitude adopted towards the Mantoux reaction in an otherwise well-written chapter on pulmonary diseases in children and diagnostic methods include no reference to the newer technique of bacteriological cultures. The relation and inter-dependence of the sanitarium, community and practising profession are emphasized and the book definitely helps to bridge the existing gaps. Doctor Ellman is more conservative than many of his contemporaries in the use of artificial pneumothorax, his indications being rather guarded, but this is probably a wise course in writing for those less familiar with this valuable procedure.

The physician who is in any way concerned with pulmonary conditions will find this a clear, comprehensive and honest effort to clarify and present the existing knowledge of lung disease in a practical manner.

A Clinical Study of the Abdominal Cavity and Peritoneum. E. M. Livingston, B.Sc., M.D., Associate Visiting Surgeon to the Bellevue Hospital, New York. pp. xxii and 866, illustrated. Price $15.00. Paul B. Hoeber, New York, 1932.

A book on the applied anatomy and physiology of the abdomen is always welcome. This volume is well planned and lavishly illustrated. It is divided into three sections: the cavity and its walls; the viscera; and visceral neurology. Added to these are short biographical notes and reproductions of the publications of men who have been immortalized in "abdominal literature." A rather pointless questionnaire is followed by a well-selected bibliography. The admirable plan and the excellent material in the book are marred by the inclusion of much information which is so elementary that it irritates the post-graduate reader for whom the book is designed. The pruning-away of much of this would have added to the interest of the volume. The time-honoured explanation of the Troisier-Virchow lymph gland in gastric carcinoma is given, although it is probable that such an explanation is incorrect. Several points of view in the section on visceral neurology are not now accepted by neurologists. Head's notion of anatomical units for each of the components of cutaneous sensation has not stood the test of time, but it has been included in the form of a diagram which gives the impression of reality to a discarded theory. The motor innervation of the diaphragm has been shown to be through the phrenic nerve and not as stated by the author—the phrenic and intercostal nerves. These defects serve only to throw into relief the excellent clinical material and the keenness of the author to find a structural and functional basis for signs and symptoms in the patient.

A Hand-Book of Ocular Therapeutics. Sanford R. Gifford, M.A., M.D., F.A.C.S., Professor of Ophthalmology, Northwestern University Medical School, Chicago. 272 pages, illustrated. Price $3.25. Lea & Febiger, Philadelphia, 1932.

Gifford states in his preface that he has attempted this work because of the absence in English of any recent concise book on therapeutics, and because in the larger works on this subject, there is such a profusion of information that it is difficult to select the essentially valuable procedures from the purely traditional ones. This little book consists of 16 chapters, and takes up equipment, anæsthetics, narcotics and hypnotics, drugs and organic extracts used in ophthalmology, specific and non-specific protein therapy, diseases of the lids, conjunctiva, cornea, uveal tract, crystalline lens, glaucoma with subdivisions, diseases of the retina, optic nerves, lachrymal apparatus, disorders of the muscular apparatus, and injuries of the globe. The information is quite up to date, and the book will be found of great use to practising ophthalmologists. From the reviewer's point of view Sabatsky's method of dealing with corneal ulcers might have been taken more notice of, and also the statement that "Argyrol is much used but without serving any useful purpose, I believe", is quite an exaggeration.

Diagnosis and Treatment of Venereal Diseases in General Practice. L. W. Harrison, D.S.O., Ch.B., F.R.C.P.E., Director of Venereal Department, St. Thomas's Hospital, London. Fourth edition, 567 pages, illustrated, price $8.00. London, Oxford University Press; Toronto, McAinsh & Co., 1931.

Anything from the pen of Col. L. W. Harrison on the subject of venereal disease is likely to be treated with a great deal of respect by the medical world. As is perhaps proper, the greater part of the volume is devoted to the subject of syphilis, although special chapters deal with the treatment of gonorrhœa, the venereal diseases of women, the prevention of venereal disase, the medico-legal aspects of venereal disease and allied subjects. One can find very little to criticize in this valuable volume. While not intruding too far into the field of the specialist, it is sufficiently comprehensive to meet most of the needs of the general practitioner who is frequently woefully lacking in a proper understanding of the essentials of this subject. From every point of view the critical period of the treatment of venereal disease is in the early stages. This fact is recognized in the attention which the volume under review gives to the matter of early diagnosis. The most satisfactory aspect of this valuable addition to our armamentarium in the fight to control venereal disease is the evidence which it offers of the author's painstaking endeavour to do all that a clinician can in a volume of this type to emphasize the need for getting his patient under treatment as quickly as possible, for keeping him continuously under treatment, and making sure that he is cured before letting him return to civil life.

There may be some who will say that Colonel Harrison's insistence upon three complete 92-day courses for sero-negative primary cases and four courses for sero-positive primary syphilis represents an extreme point of view, and doubtless many cases could do with less. Yet he proves that if one is to make sure of a cure in as many cases as possible this amount of treatment is necessary. The importance of prolonged observation of the apparently cured is stressed as this point should be and his attitude towards lumbar puncture in all such cases is quite in accord with orthodox scientific opinion.

Chemical Embryology. Joseph Needham, M.A., Ph.D., Demonstrator in Biochemistry, Cambridge University. Three volumes, 2021 pages, illustrated. Price $31.00. Cambridge University Press: Macmillan Co. of Canada, Toronto, 1931.

The first feeling that a study of this large book evokes is one of disappointment; from this mountainous labour emerge but a few ridiculous mice of general conclusions. This is not the fault of the author; chemical embryology is a subject which appears to hold rich promise, and many have been tempted to explore it, but unfortunately few have been

willing to devote intensive study to it. Too often problems in chemical embryology have been undertaken lightly as an interesting side-line for a summer month at a seaside laboratory, or relegated to some inexperienced junior. Consequently this monumental review has to discuss much work which is frankly bad, and more which has been conceived and worked out with too little reference to the existing data, and which in consequence has contributed little or has blindly run aground upon some shoal already well charted. It is to be hoped that this work may at least reduce the number of these needless casualties and direct the attack into the most profitable channels. As a work of reference and guidance, Doctor Needham's book, with its full index and enormous bibliography, will be invaluable to those interested in the subject. It cannot be so confidently recommended as an introduction to the subject; one would not start a junior zoology student in dissection upon the corpse of a hippopotamus. The author seems to be too willing to accept generalizations based on limited data; and it is curious that there is so little discussion of the chemical factors controlling and directing growth and differentiation in a work which finds room for a good deal of abstract philosophical discussion.

The Practice of Contraception. An international Symposium and survey. M. Sanger and H. M. Stone, M.D. 317 pages, illustrated. Price $4.00. Williams & Wilkins, Baltimore, 1931.

In September, 1930, the Seventh International Birth Control Conference was held at Zurich, to discuss the technical problems of contraception. Physicians, laboratory investigators and clinical directors came together to report upon their work, their results and organization. This volume contains the papers read, and the discussions held which were most illuminating and add greatly to the value of the contributions. The most commonly employed contraceptive is the vaginal diaphragm combined with a jelly or an ointment. A full description of Graefenburg's silver intrauterine ring is given. This is used extensively in Germany, and is claimed to be both harmless and effective, but it was generally agreed that further investigation was necessary before its use could be advocated. The value of douches, chemicals, safe periods, hormones, etc., is discussed.

The book, which is concisely and clearly written constitutes the most recent authoritative survey of contraceptive methods and of the research being carried on at present in this line.

Control of Conception. R. L. Dickinson and L. S. Bryant. 290 pages, illustrated. Price $4.50. Williams & Wilkins, Baltimore, 1931.

This volume issued by the National Committee on Maternal Health is a record of what is known of the means and the medical indications for control of conception. It is based on eight years of study, partly anatomical and physiological, but to a large extent practical, in that the results obtained in some eighty clinics in the United States as well as in several European centres have been carefully studied. The book may be divided into three sections. In the first part, the anatomy and physiology of contraception is presented as a scientific background; in the second section, the technique by means of condom, pessary, jelly, intrauterine stem, withdrawal, hormones, etc., is thoroughly and clearly discussed, as well as means of sterilization and of therapeutic abortion; while the final chapters outline the organization and plans on which such clinics are run and the outlook for the future. This present monograph which is a forerunner of a larger book, deals with the subject in a brief, concise, didactic manner. The text is greatly clarified by illustrations.

BOOKS RECEIVED

Living the Liver Diet. Elmer A. Miner, M.D., Independence, Kansas. 106 pages, price $1.75. St. Louis, C. V. Mosby Co.; Toronto: McAinsh & Co., 1931.

International Clinics. Vol. IV. Edited by Henry W. Cattell, A.M., M.D., and others. 328 pages, illustrated. J. B. Lippincott Co., Philadelphia, London and Montreal, 1931.

Conquering Arthritis. H. M. Margolis, M.D., Pittsburgh, Pa. 192 pages. Price $2.50. New York: Macmillan Co.; Toronto: Macmillan Co. of Canada, 1931.

A Non-surgical Consideration of Prostatic Enlargement. Edwin W. Hirsch, M.D., Associate in Urology, College of Medicine, University of Illinois, etc. 79 pages. Price $2.00. Bruce Publishing Co., Saint Paul, Minn., 1931.

Gastric Acidity. An Historical and Experimental Study. John Douglas Robertson, M.D., Assistant Chemical Pathologist to the Middlesex Hospital, London, W.1. 76 pages, price 5/- net. Published for Middlesex Hospital Press by John Murray, London, 1931.

United States X-Ray Manual. Lt. Col. H. C. Pillsbury, M.C., U.S.A. Second edition. 482 pages, illustrated. Price $5.00. Paul B. Hoeber, Inc., New York, 1932.

The Biochemistry of Muscle. Dorothy Moyle Needham, M.A., Ph.D., Biochemical Laboratory, Cambridge. 166 pages, price 5s. net. Methuen & Co., 36 Essex Street, W.C. London, 1932.

The Insanity Plea. Edward Huntington Williams, M.D., author of "The Doctor in Court". 169 pages, price $2.00. Williams & Wilkins, Baltimore, 1931.

One Thousand Marriages. Robert L. Dickinson and Lura Beam. Illustrated, price $5.00. Williams & Wilkins, Baltimore.

A Doctor of the 1870's and 80's. William Allen Pusey, A.M., M.D., LL.D., Sometime President of the American Medical Association. 153 pages, illustrated. Price $3.00. Charles C. Thomas, Springfield, Ill., and Baltimore, Md., 1931.

One Hour of Medical History. Compiled by Benjamin Spector, M.D. 88 pages, illustrated. Price $1.00. The Beacon Press, 25 Beacon St., Boston, 1931.

Research Work on the Pneumococci and Their Enzymes and Its Significance in Lobar Pneumonia. A. Cowan Guthrie, M.B. 60 pages, price 7/6 net. Baillière, Tindall & Cox, London, 1932.

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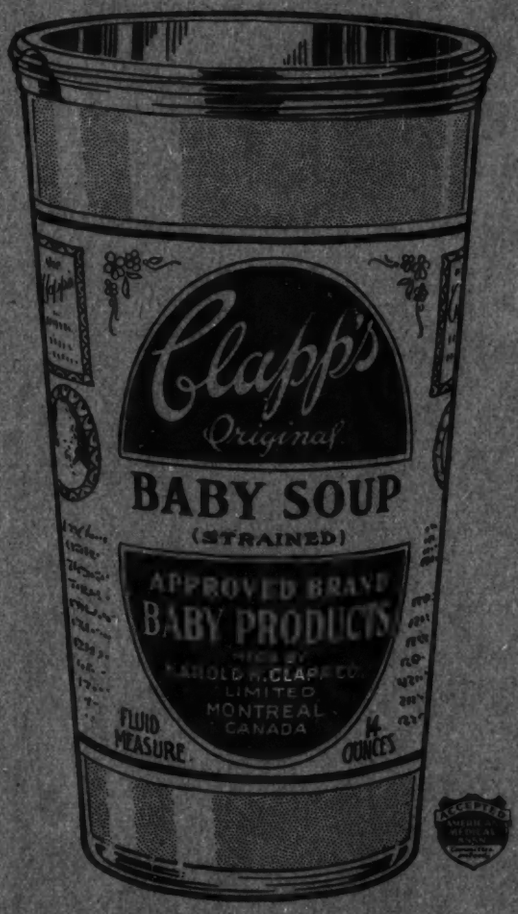

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